# The Builder.

VOL. LXXX.—No. 3026. FEBRUARY 2, 1901.

## ILLUSTRATIONS.

Glasgow Royal Infirmary Competition: Design placed first by the Assessor.—Mr. H. E. Clifford, Architect :—
Perspective View towards Infirmary Square ..... *Double-Page Photo-Litho.*
Sectional Elevations ..... *Double-Page Photo-Litho.*
Plans ..... *Double-Page Photo-Litho.*
Interior View of St. Peter's (In Illustration of Professor Aitchison's Royal Academy Lectures) ..... *Double-Page Ink-Photo.*

*Blocks in Text.*

Diagrams Illustrating First Royal Academy Lecture on St. Peter's .. Pages 103-7 | Diagrams Illustrating Student's Column ..... Page 118
Plan of the Fire Prevention Exhibit for the Building Trades' Exhibition ..... Page 120

## CONTENTS.

Building Stones in the Natural History Museum, Vienna ..... 101
Notes ..... 103
Letter from Paris ..... 104
First Royal Academy Lecture on St. Peter's ..... 105
Colour in Architecture ..... 108
Architectural Societies ..... 111
Engineering Societies ..... 111
The Glasgow Infirmary Competition ..... 112
The Surveyors' Institution ..... 112
The London County Council ..... 112
The London Building Act, 1894: The L.C.C. and Building Lines ..... 113
Illustrations :—
Glasgow Royal Infirmary Reconstruction ..... 114
Interior View of St. Peter's ..... 114
Proposed New Water Regulations ..... 114
Competitions ..... 114
Earthworks and Castles of Early England ..... 114
Applications Under the 1894 London Building Act ..... 115
Technical Education in Galician Austria ..... 115
Books: E. H. Essex's "Theory of Engineering Construction: A Reference-book for Civil Engineers and Students"; A. T. Walmisley's "Field Work and Instruments" and "Land Surveying and Levelling"; W. F. Stanley's "Mathematical Drawing Instruments"; "The Practical Engineer Electrical Pocket-Book for 1901"; W. W. Snailum's "Fifteen Studies in Book-keeping" ..... 116
Books Received ..... 116
Correspondence :—
Clerks of Works and Builders ..... 117
The Student's Column: Sanitary Fittings and Plumbing. 4 & 5 ..... 117
Obituary ..... 119
General Building News ..... 119
Sanitary and Engineering News ..... 119
Miscellaneous ..... 119
Capital and Labour ..... 121
Legal :—
Important Points Under the Public Health Act, 1875 ..... 121
Responsibility for Drainage Work ..... 121
"Tube Tremors" ..... 121
The Central London Railway ..... 121
Action by an Architect ..... 121
Recent Patents ..... 122
Meetings ..... 123
Some Recent Sales of Property ..... 123
Prices Current of Materials ..... 123
Contracts and Public Appointments ..... 124
Tenders ..... 125

### *Building Stones in the Natural History Museum, Vienna.*

If we exclude the magnificent collection of stones for building and decoration exhibited in the National Museum at Washington, there is no better public collection of these materials in the world than is to be found in the Naturhistorischen Hofmuseums, on one side of the Maria-Theresia-platz, in Vienna. The American collection has been well described by its curator, Mr. G. P. Merrill; but when we saw it, a few years ago, it was very indifferently housed, and the materials were regarded more from a geological than an architectural standpoint. The same cannot be said of the collection in Vienna; it is located, together with other collections, in a magnificent building erected a few years ago in the Italian Renaissance style, chiefly from designs by Semper; the use of various decorative stones is well exemplified in the interior, the walls of the vestibule, grand staircase, doorways, &c., being built or lined with them; whilst the systematic collection of stone samples is well displayed—and the finishing touches have recently been given to their arrangement and classification. Professor Felix Karrer has accomplished the chief part of the work, so far as the museum collection is concerned, and his aim has been to present the different materials in such a manner that the samples may prove useful to architects, engineers, and surveyors, rather than to the systematic lithologist or mineralogist. The interests of these latter are well cared for in the general petrological collection, kept apart from the building stone collections—and this is as it should be, for whilst the petrologist is mainly concerned with stones in their genetic relationships, and from a purely scientific standpoint, no matter whether they are used for practical purposes or not, the architect, engineer, or surveyor is mainly interested in them as materials of construction.

This collection in Vienna should serve as a model for all others of a similar description. We should like to see the authorities at our Jermyn-street Museum—which purports to be a museum of practical geology—do something on the same lines. Professor Karrer has not been contented to merely label each specimen of stone with its scientific name and locality, but he has written a book on the collection in which are numerous reproductions of photographs of public buildings, together with some account of the building and decorative stones employed in their construction. The museum specimens are thus closely identified with their practical uses.

The collection is not confined to the stones used in Austria-Hungary, though they are, naturally, chiefly represented. The following is a general summary and the method of classification adopted. The whole of the materials are primarily divided geographically; Austria is subdivided for the purpose of the employment (not the origin) of the various materials into the following regions:—Lower Austria, including Vienna; Upper Austria, Linz; Salzburg and its environs; Tyrol, Innsbruck; Vorarlberg, Bregenz; Styria, Gratz; Carinthia, Klagenfurt and Villach; Carniola, Laibach; Görz and Gradisca, Görz; Trieste and neighbourhood; Istria, Parenzo and Rovigno; Dalmatia, Zara; Bohemia, Prague; Moravia, Brünn; Silesia, Troppau; Galicia, Lemberg and Cracow; and Bukowina, Czernowitz. Hungary is divided into three regions:—Hungary proper, including Buda-Pesth; Siebenbürgen, Hermannstadt and Klausenburg; and Croatia, Agram. Foreign localities are represented as follows:—Germany, Italy, France, Belgium, England, Norway, Russia, Switzerland, Spain and Portugal, Greece, United States, Asia, and Africa.

As far as possible, these various regions are further subdivided according to the material. Thus, the materials of construction used in Lower Austria are divided into:—(1) Road and street stones; (2) paving stones; (3) raw materials for bricks and tiles; (4) sands for mortar; (5) raw materials for lime; (6) cement; (7) building stones; (8) stones for decoration; (9) slates; (10) artificial stones, &c., including fire-stone, asphalt, and terra-cotta; and (11) various materials, such as gypsum, ochre, and talc-schist.

The foreign building stones are not as well represented in the collection as they might be; those from Great Britain are very few, and are not at all characteristic. The German collection is as good as any, but the antique Italian (Roman) marbles and cements are well represented. The curators had, of course, to be contented with what they could get, but they do not seem to have gone to work in such a painstaking manner as have the authorities of the National Museum at Washington in reference to the collection of foreign materials. Thus, the Viennese are invited to regard the alluvial sand of the Seine as a characteristic French mortar sand, that being the only specimen exhibited from France; again, the Eocene plastic clay of Vanvers (called "argille (*sic*) plastique") does duty for French clays suitable for making bricks and tiles. When we look at the fine collection of freestones and stones used for decoration in France, however, it is not difficult to see that much more attention has been bestowed on the collection of these. Russia is very badly represented in the collection, and what few decorative stones are exhibited are not at all characteristic. Instead of a number of the largely used granites from Finland (which can be very easily obtained), and such excellent stones as the Isaac Cathedral in St. Petersburg, and the church of the Saviour, Moscow are built of, we only find such insignificant minerals as rhodonite, amazon-stone, malachite, jasper, &c., which are only employed in the manufacture of jewellery, bric-a-brac, and the like. Moscow marble is represented, and there is a practically unknown granite from Siberia. These do not

give an idea of Russian building stones at all, and this section of the collection requires strengthening.

Professor Karrer has conceived the happy notion of indicating the uses of various principal building stones exhibited by a number of illustrations of public buildings, as already mentioned. The following are the edifices he has selected, not from their architectural interest necessarily, but as showing the capability of the different materials, and as giving an all-round idea of some of the most important European stones for building and decoration.

It is natural that Vienna claims most attention, and the buildings selected for illustration in that city are :—

1. *St. Stephen's Cathedral.*—The oldest part of the building, up to the fifteenth century, is erected of Miocene calcareous sandstone from Zogelsdorf and Eggenburg; since then the remainder of the edifice and various works of restoration have been completed of Miocene limestone from Breitenbrunn, Eisenstadt, and neighbourhood. The earliest portions of the present building were erected in 1258-1276 on the site of a church destroyed by fire.

2. The *Votive Church* in Maximilian's Platz, erected in the Gothic style from designs by Ferstel in 1856-79, is one of the finest churches in Vienna. It is mainly built of Miocene limestone from Wöllersdorf, Mühlendorf, and Brünn, and another kind of limestone from Grisignana. The columns, chancel, and balustrades in the interior are of onyx marble from Egypt.

3. *Houses of Parliament* (Reichsraths-Gebäude), an imposing edifice in the Greek style by Hansen. The lower portions of the building are of granite from Neuhaus and Grasstein; the stairs and balcony of limestone from Repentabor and St. Croce; and the upper portions chiefly limestone from St. Croce and Cava Romana.

4. *Town Hall*, built in 1873-83 by Schmidt, in the Gothic style, principally of Miocene limestone from Wöllersdorf, Margarethen, Mannersdorf, and other limestone from Istria, Trient, &c.

5. The *Natural History Museum* has already been alluded to, and we need only add that the lower part up to the first floor is of calcareous sandstone from Zogelsdorf, whilst the remainder of the exterior is of similar material from Mannersdorf, Mokritz, Vicina, &c., and other limestone from Medolina and Merlera.

6. The *Maria Theresia Monument*, opposite the Burgthor, designed by Zumbusch, the pedestal by Hasenauer, was erected in 1888. It is chiefly of bronze, but the steps are of granite from Mauthausen, the plinth of granite from Petersburg, in Bohemia, and the columns of serpentine from Wissen, near Sterzing.

7. The *University*, situated on the Franzens-Ring, a large quadrangular structure in the early Tuscan Renaissance style, was built by Ferstel in 1873-84. The upper parts of the building are of Grisignana limestone, the plinth of Miocene limestone from Wöllersdorf, and the entrance and steps of crystalline limestone from Grasthal.

8. The *Hofburg Theatre*, opposite the Town Hall on the east side of the Ring Strasse, is in the later Renaissance style, built from designs by Semper & Hasenauer in 1876-89. Practically the whole is of limestone from Pomer, Marzano, and Merlera, in Istria, but columns in connexion with the window decoration are of limestone breccia from Seravezza, near Carrara, in Italy.

9. The *Imperial Opera House*, a grand Renaissance building, was erected in 1861-69 from designs by Van der Nüll and Siccardsburg. The higher portions of the façade and the plinth are of Miocene limestone from Wöllersdorf and Brünn; the columns and plinth of the lower parts of the building flanking the façade are chiefly of limestone from Aviano and Kelheimerstein, in Bavaria.

From the above it will be noticed that Vienna architects have considerable preference for limestones, at any rate for large buildings. These are principally light in tone, and many of them withstand the action of the weather remarkably well. Their general appearance, as used during the last half-century, is not unlike the *calcaire grossier* so largely employed in Paris. It will also be observed that many of these limestones are quarried considerable distances from Vienna, and that immense trouble has been taken to secure suitable materials, whereby the beauty of the Austrian capital has been greatly enhanced. The calcareous sandstone employed in recent years seems to be of better quality than that kind of stone generally is. Granite is but sparingly used for large buildings in Vienna. It was only natural, however, that it should find its way into such a massive Classical structure as the Houses of Parliament, where it blends perfectly well with the lighter limestones of which the upper portions of the edifice are chiefly constructed. We are unable to mention specifically the numerous stones used for decorating interiors, though Professor Karrer is careful to indicate most of the important ones and parts of prominent buildings where they may be seen, apart from the museum specimens. The foreign marbles chiefly employed are the same as we have seen in London, Berlin, Madrid, Paris, St. Petersburg, aad Brussels; the native marbles have, naturally, claimed a great deal of attention, though we cannot say, looking at them as a whole, that they are conspicuous for their beauty.

Turning to the building stones used in Upper Austria, the following edifices are selected for illustration :—

10. The new *Cathedral*, *Linz*, commenced in 1862 from the designs of the late V. Statz, of Cologne. The freestone is Vienna sandstone from Mais, near Altlengbach; the plinth and columns are Neuhaus granite.

11. The new *Museum*, *Linz* (known also as the Francisco-Carolinum Museum), was built in the late Renaissance style in 1895, from designs by Bruno Schmitz, of Düsseldorf. This is a brick building with stone dressings. Around the second floor, in front and on the east and west sides, runs a frieze 8 ft. in height, designed by the late Professor zur Strassen, of Leipsic, and executed by R. Cöllen, portraying the progress of culture in Upper Austria from the earliest times down to its occupation by the House of Hapsburg. The frieze is made of white Tertiary sandstone from Stotzing and Goys, and the steps of limestone from Santa Croce.

Buildings illustrating the use of stone in the Salzburg district are :—

12. The *Sigmundsthor*, *Salzburg*, hewn out of the Tertiary conglomerate of the Mönchsberg, which is a common building stone in that part of Austria.

13. The *Cathedral and Fountain*, *Salzburg*, situated in the Residenz Platz. The cathedral was erected in 1614-28 by Santino Solari in the late Renaissance style, principally of the Tertiary conglomerate of the neighbourhood and limestone from the Untersberg; whilst the fountain, also of the last-mentioned stone, was executed in 1664-80 by Antonio Dario.

The two buildings selected for the Tyrol are :—

14. The *Triumphal Arch*, *Innsbruck*, erected in 1765, of Quaternary breccia from Hötting.

15. The *Parish Church*, *Botzen*, a Gothic building of the fourteenth and fifteenth centuries, constructed of sandstone and porphyry.

An illustration from Carinthia is—

16. The *Dragon Fountain of Klagenfurt*, placed in the principal square of the town in 1590. The dragon is hewn out of a monolith nearly 7½ metres in length, and is of green phyllite from the Kreuzberg, about two miles from the town.

Southern Austria is exemplified by—

17. The new *Offices of the Austrian Lloyd Steamship Company*, *Trieste*, a palatial building designed by Ferstel; chiefly made of Istrian limestone; the plinth is of stone from Orsera, the pillars, &c., of Santa Croce limestone.

18. The *Palace of Miramar*, *near Trieste* constructed of Istrian limestone.

19. The *Piazza dei Signori*, *Zara*, Dalmatia, of limestone from the neighbouring islands of Curzola and Brazza.

Other buildings in Austria illustrated are—

20. *Teyn Church*, *Prague*, commeneed in 1360, with additions 1460, is the old church of the Hussites. It is built of limestone from Weissen Berge, Strahou and vicinity, and sandstone and Silurian quartzite. The decorated parts are all of sandstone.

21. "*Powder Tower*" (*Pulverthum*), *Prague*, a late Gothic gate tower, erected in 1475-84, and restored in 1883. The older parts are of sandstone from Nehwiz, and the newer of the same kind of stone from Horitz.

22. *Town Theatre*, *Brünn*, the capital of Moravia, built in 1882 from designs by Fellner and Hellmer. The groups of figures are of Tertiary calcareous sandstone from Breitenbrunn; steps and staircases of limestone from Kaisersteinbruch; plinth, columns and attics of sandstone from Wildenschwert and Brüsau; steps in front of the building of sandstone from Skalitz; staircases to the boxes of Istrian limestone.

23. *St. Peter's Church*, *Cracow*, erected 1597-1619, is constructed chiefly of the Upper Jurassic limestone found in the vicinity of the city.

The building stones of Hungary are well represented in the collection. The constructions selected for illustration are :—

24. The *Suspension Bridge* (*Kettenbrücke*), *Budapest*, the masonry of which is chiefly of Tertiary limestone from Soskut, with granite from Mauthausen, in parts.

25. *Royal Academy of Science*, *Budapest*, is principally of limestone of freshwater origin from Tüttingen and Töck and another limestone from Soskut; the plinth is of granite from Mauthausen, in Upper Austria, and from Meissen, in Saxony.

26. The *Redoute Buildings*, *Budapest*, erected in 1862-65 in the Romanesque-Moorish style, from designs by Fessl, con-

taining some of the principal ball and concert rooms in the city, is built of Sarmatian limestone from Soskut and red Liassic limestone from Tardos and Piske.

27. The *Opera House, Budapest*, built in 1875-84 in the Italian Renaissance style by Ybl, is of freshwater limestone from Süttö and Uröm and the Soskut limestone.

28. The *Cathedral, Gran*, is a large edifice in the Italian Renaissance style, built of the same limestones as the Budapest Opera House, together with trachyte from the neighbourhood.

From the foregoing it will be observed that some of the most imposing edifices in Budapest are chiefly built of limestone from the neighbourhood of Soskut and Süttö, which are very durable materials of their kind, and are readily worked.

Stones for building and decoration as used in Germany are well represented in the collection, and the museum authorities illustrate them by the following buildings:—

29. *Cathedral, Cologne*, constructed mainly of Cretaceous and Jurassic limestone from Bavaria and France, sandstone from the Trias of Germany, Wealden sandstone from Bückeberg, and trachyte from the Siebengebirge.

30. *Cathedral, Regensburg*, of Jurassic limestone and green Cretaceous sandstone from Bavaria.

31. *Cathedral, Strassburg*, of red sandstone found in the vicinity.

32. Large *Fountain, Nuremberg;* the basin of Wealden sandstone from Obernkirchen, the pyramid of Triassic sandstone from Zeil, Wendelstein, &c.

33. The *Catholic Church, Dresden*, the lower portions of sandstone from Cotta, the upper of similar material from Posta, near Pirna.

34. *Pavilion, Dresden*, of sandstone from Elbthale.

35. *Royal Opera House, Dresden*, of stone from the same locality.

Other foreign buildings illustrated are:—

36. *St. Peter's, Rome*, façade, from the base up to the cupola, of travertine from Fiano in the Sabine mountains; columns of the portico and the statues in connexion, of travertine from San Clemente (*Lapis Tiburtinus*).

37. *Cathedral, Milan*, erected almost entirely of crystalline limestone from Gandoglia, near Mergozzo Lake, and other localities not far away on the Lago Maggiore.

38. *Notre Dame, Paris*, built almost entirely of Tertiary calcaire-grossier of the Paris basin.

39. *Grand Opera House, Paris.*—A great part of the principal façade is of Jurassic limestone from Larrys; whilst the parterre is of similar limestone from Anstrudes and Ravières. Other parts of the building are also of Jurassic limestone, and of Tertiary calcaire-grossier from several localities. The decorative stones employed come from well-known places in Italy, Sweden, France, &c.

40. *Palace of Justice, Brussels;* principally of massive, crystalline, blue, Carboniferous limestone from Namur, and white Jurassic limestone from France. In a lesser degree (some columns, &c.) of Carboniferous limestone from other localities.

41. *Hotel de Ville, Brussels;* the old portion of the building is of Eocene calcareous sandstone from the vicinity; later work, restorations, &c., of Eocene limestone from Gobertang.

42. *Hotel de Ville, Schaerbeck*, near Brussels, is of brick and Carboniferous limestone from Namur.

The only adverse criticism we would offer to this list is that some of the buildings selected for illustration are close together, or in the same city, whereby we do not get quite such a good idea of the range of European building stones as might otherwise have been the case. There was no need to have given so many examples from Vienna and Budapest, for instance, if the number of illustrations were to be so limited—though Vienna museum officials might readily be pardoned for so doing. Dresden and Brussels, again, are given three illustrations each. We should have thought it better to have brought together a few examples from Spain, Russia, and England, in lieu of some of these duplicates. However, we will not complain, for, as we have previously stated, the Vienna collection of building stones itself is a remarkable one, and well worth careful study by architects.

## NOTES.

Institute of Architects.

A CIRCULAR has been issued by the Council of the Institute of Architects to the effect that the meeting for the presentation of prizes and studentships announced for Monday, February 4, is postponed till Monday, February 25, at eight p.m., "in consequence of the lamented death of her late Most Gracious Majesty Queen Victoria, Patron of the Royal Institute." The Institute will be closed on the day of the Royal Funeral, Saturday, February 2. At the meeting of February 25 an address of condolence to his Majesty will be moved from the chair at eight p.m.

Buildings under the Public Health Act.

IT is a matter of some regret that the official law report should continue to chronicle cases which do not really lay down any principle of law, but are cases depending on the view taken by the Bench of certain facts. Last week, the Queen's Bench Division (so called by statute) had to decide whether a weighing-machine shed at Southend-on-Sea was a building within the meaning of Section 157 of the Public Health Act, 1875, which empowers urban authorities to make by-laws "with respect . . . to new buildings. . . ." The structure in question appears to have borne a considerable resemblance to a bathing-machine, and the Justices held that it was not a "building." This decision was appealed against, but was upheld. In the course of the argument several cases were referred to as governing the one under discussion—not cases laying down a principle of law, but resembling the present one in their facts. But a very slight difference may be sufficient to cause a judge to consider one structure to be and another not to be a "building," and one result of reporting and preserving such cases is to mislead persons. Each of these cases must be considered on its merits; and, as we have said, a slight dissimilarity, such as movability or unmovability, may cause judicial decisions to vary.

Smoke Abatement.

SIR W. RICHMOND, as President of the "Coal Smoke Abatement Society," has addressed a letter to the Secretary of the London School Board, which has been printed in the *Times*, calling on the School Board to use the influence which its position gives it, as the largest owner of public buildings within the metropolitan area, in promoting and recommending the use of grates which will ensure perfect combustion. Sir W. Richmond considers that the Society which he represents has been very successful in procuring the enforcement of the existing law in regard to the issue of smoke from trade and manufacturing buildings, but admits that it is a greater difficulty to reach the domestic fire. He says:—

"It is in the latter direction that the society ventures to beg your assistance. Many forms of grates and stoves are already in the market which are designed to materially reduce the evil of imperfect combustion, and the society would respectfully suggest that wherever occasion arises your Board would specify for some form of these apparatus being used in its buildings. Such an example set by so influential a body could not fail to have a most salutary effect, and be of the utmost assistance to the society in its work.

I should add that a similar suggestion has been made to her late Majesty's Government, and has been received by them with a promise to put it in operation without delay and whenever possible, and even to furnish facilities for trials in order to ascertain the best form of grate for the purpose."

It is no doubt in the direction of the use of grates calculated to ensure perfect combustion that the true remedy lies—short of abandoning coal fires altogether for gas fires, which we do not think is likely to be done. As we pointed out before, the recommendation of such remedies as the use of anthracite coal alone, which has been suggested, is futile, because there is not enough anthracite available for universal use, even for a time, without sending up its price to a practically prohibitive extent. Much may be done by grates better formed for consumption of fuel than many of those in ordinary use; but it must be remembered that some of these pre-suppose special arrangements for the admission of air, which cannot always be applied in houses already built.

Fencing Machinery.

MR. ARTHUR WHITELEGGE, the Chief Inspector of Factories under the Home Office, has issued a special circular in regard to the important subject of the proper fencing of machinery in motion, especially with regard to new machines. He points out that while much progress has been made in applying guards to existing machinery, new machines in other respects improved, are still sent out by the makers without due regard to this essential point; and, moreover, that precautions which are taken as a matter of course in the case of those made for export are often omitted in the construction of similar machinery intended for use in the United Kingdom. "Hence many serious and fatal accidents arise, and at best the fencing which can be carried out later by the purchaser is usually less effective and more costly, even apart from the risks attending delay. And further, it is obviously more easy when designing a machine to provide proper places for guards than to have to fit guards on to a machine designed without any provision being made for them." Among special points in the extracts appended to the circular it is mentioned that the apparently small matter of having set-screws with projecting heads on drill and lathe chucks has produced many accidents, and that many workmen will use projecting set-

screws even after the chucks have been altered and recessed to allow the screw to go flush with the chuck. No doubt carelessness (or sometimes ignorance) on the part of workmen is the cause of many accidents that need not have happened; and in the Walsall district we learn that it is a practice to paint all machine guards a bright red, as a kind of signal that there is danger inside their lines. It is noticed that American machinery is generally sent out by makers much more efficiently guarded than that made by English firms. The subject ought to have the careful attention of all owners or managers of factories worked by machinery.

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Girton College, Cambridge.

SUBSCRIPTIONS to the amount of 31,000*l.* are invited towards the extension scheme which is being carried out at Girton College, Cambridge. The entire scheme, which will cost about 55,000*l.*, comprises a new hall and servants' quarters (now ready), kitchens, lecture rooms, rooms for fifty students, a chapel, a swimming bath, and additional rooms for the resident staff, to be erected after the plans and designs of Messrs. Alfred Waterhouse & Son. The old hall will, we gather, be converted for purposes of the library. Mr. Waterhouse's former designs for the College were exhibited at the Royal Academy in 1887, and were noticed in our columns of May 7 of that year. They consist of blocks of houses in red brick with black and white gables, and a gate-tower.

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Professor Aitchison's Lecture.

PROFESSOR AITCHISON commenced on Monday his course of lectures at the Royal Academy on the ever-interesting subject of St. Peter's: the lecture is printed on another page of this issue. All the Professor's friends will have been glad to see him apparently in much better health than at his last year's lectures. The lectures are illustrated by a number of drawings and photographs hung on the walls, both of St. Peter's as it exists and of various other preliminary schemes of Bramante and San Gallo, and also by a number of lantern slides. Two of the architectural members of the Academy, Mr. T. G. Jackson and Mr. Belcher, were among the audience.

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THE QUEEN'S DEATH.—On account of the death of her Majesty the Queen the ordinary general meeting of the Architectural Association, advertised for February 1, has been postponed to February 8, at 7.30 p.m., when a paper will be read by Mr. D. T. Fyfe on "Cretan Architecture."—The annual dinner of the Sanitary Inspectors' Association, to have taken place on Saturday, February 2, is postponed until February 15, at the Venetian Chamber, Holborn Restaurant, when the Archdeacon of London will preside.—The annual dinner of the Builders' Foremen's Association has been postponed from February 2 to February 9.—It was agreed on the 25th ult., by the Council of the Northern Architectural Association, that the following resolution be sent to Sir Arthur Bigge, Osborne House, Isle of Wight:—

"SIR,—On behalf of this Association we beg that you will be the medium of conveying to his Majesty the King and the Royal Family the deep sympathy of this Association in their great sorrow, and at the same time to express their sincere loyalty to the Throne of these Realms.—We are, sir, for the Northern Architectural Association, President, Wm. Glover; Hon. Secretary, A. B. Plummer."

The following is the resolution passed at the meeting of the Dublin Local Section of the Institution of Electrical Engineers on the 24th ult., proposed by Mr. Porte and seconded by Mr. Ruddle:—

"That we, the Dublin section of the Institution of Electrical Engineers, desire to record the deep grief with which we have received the news of the death of our late beloved Sovereign, Queen Victoria, and that this meeting do forthwith adjourn as a mark of our sorrow. Also that the Central Institution propose to present a vote of condolence with the Royal Family, it is the desire of this section to heartily endorse the same."

## LETTER FROM PARIS.

THE restoration of the dome of the Panthéon has become a matter of urgent necessity. The columns and capitals supporting the dome, the work of Soufflot, commenced in 1764 under Louis XV., are fast falling to pieces and endangering the superstructure. It is estimated that the work of repair will occupy about four years, and an important vote of money for carrying out this work is being urgently asked for.

The celebrated "Machine de Marly," near Versailles, a series of water-wheels constructed by the engineer Sualen on one of the small arms of the Seine at the time of the completion of the Château of Versailles, for the purpose of pumping the river water to the reservoirs there and for the supply of the celebrated cascades, is about to undergo a complete transformation. This old and powerful machine had already been modified somewhat under the Restoration, but it was found that the constant rise and fall of the Seine interfered greatly with the proper working of the supply; besides that the increasing contamination of the river water could no longer permit its being employed for drinking purposes at Versailles. The machine has therefore, for some time past, been employed only as power necessary to pump to the higher ground fresh water from the neighbouring springs. It has now been decided to replace the old-fashioned water-wheels, which have for so many years formed an interesting attraction at Marly, by modern turbines; but as it is necessary to avoid stopping the supply of water to Versailles for any time, however short, three of the old wheels will continue to work during the replacing of the other three, which will then allow the replacing of the three still remaining.

The construction of the new church of Saint-Jean on the hill of Montmartre has been stopped for some time by the authorities, owing to doubts as to the solidity of the new building. This church, which is to replace the old church of Montmartre, in which all public service has been stopped, and which has been classed as a "historical monument," is being built from the designs of M. de Baudot, diocesan architect, an old pupil of Viollet-le-Duc, and one of the most fervent advocates of a rational architecture evolved from a complete and rational use of modern materials. The building is being constructed entirely according to the system of armed cement known as the system Cottançin, and is therefore a perfect innovation in church building. The matter of the stoppage and the condemnation of the structure was taken up very strongly by Abbé Sobaux, the vicar of the parish, with the result that it was decided to allow the building to be continued if the trials of solidity proved satisfactory. These trials have just taken place and were found very satisfactory; the floors of the building, of a thickness of not more than 2 in., were found to resist perfectly the trial weight of 125 lbs. per superficial foot. M. de Baudot, whose private house is an interesting example of this system of construction and decoration, had every reason to obtain satisfaction as regards the strength of his new work, as he is himself General Inspector of Diocesan Buildings and has to report on the solidity of the many buildings in his diocese.

The city of Paris has just voted an important sum for the preliminary work of restoring and rearranging the Hotel de Lauzun, a fine old residence of the time of Louis XV., situated on the Quai d'Anjou in the Ile Saint Louis at Paris. This interesting old building, which for some reason had been spared during the troubles of the Revolution, was bought by the town some short time ago from the heirs of the late Baron Pichon, one of the most learned of French book-lovers, with the view of making it the museum of Parisian art of the seventeenth century. The decoration of the interior, which still exists in a marvellous state of preservation, is most sumptuous in style. The museum, when completed, will certainly be one of the most interesting places to visit in Paris.

The buildings at the late Exhibition are now being rapidly demolished, but nothing has yet been absolutely decided as to what will be done with the spaces left vacant. The international buildings on the Rue des Nations along the river bank are disappearing one by one. In a few weeks no traces will be left of the Belgian and German buildings. The English Royal Pavilion has been dismantled of all fittings and contents, and in a few weeks will be a thing of the past. The French official buildings, however, form a matter of more difficulty, for the various demolishing contractors are by no means satisfied with the specifications set out by the administration. It is wonderful how small are the offers obtained from demolishing contractors at present for buildings and materials which cost immense sums for their construction. The Porte Monumentale, designed by M. Binet, has been sold for the sum of 408*l.*, and the contractor for this sum enters into possession of 210 tons of iron, 260 cubic yards of timber, nearly 1,000 cubic yards of building stone, and over 7,000 electric globes. The German Pavilion has, it is said, been sold for 1,000*l.*

The following architects have been elected as members of the Committee of the Société des Artistes Français:—MM. Pascal, Vaudremer, Loviot, Chancel, Raulin, Normand, Scellier de Gisors, Courtois-Suffit, Formigé, and Boeswillwald, the number of votes obtained at the election being in the above order.

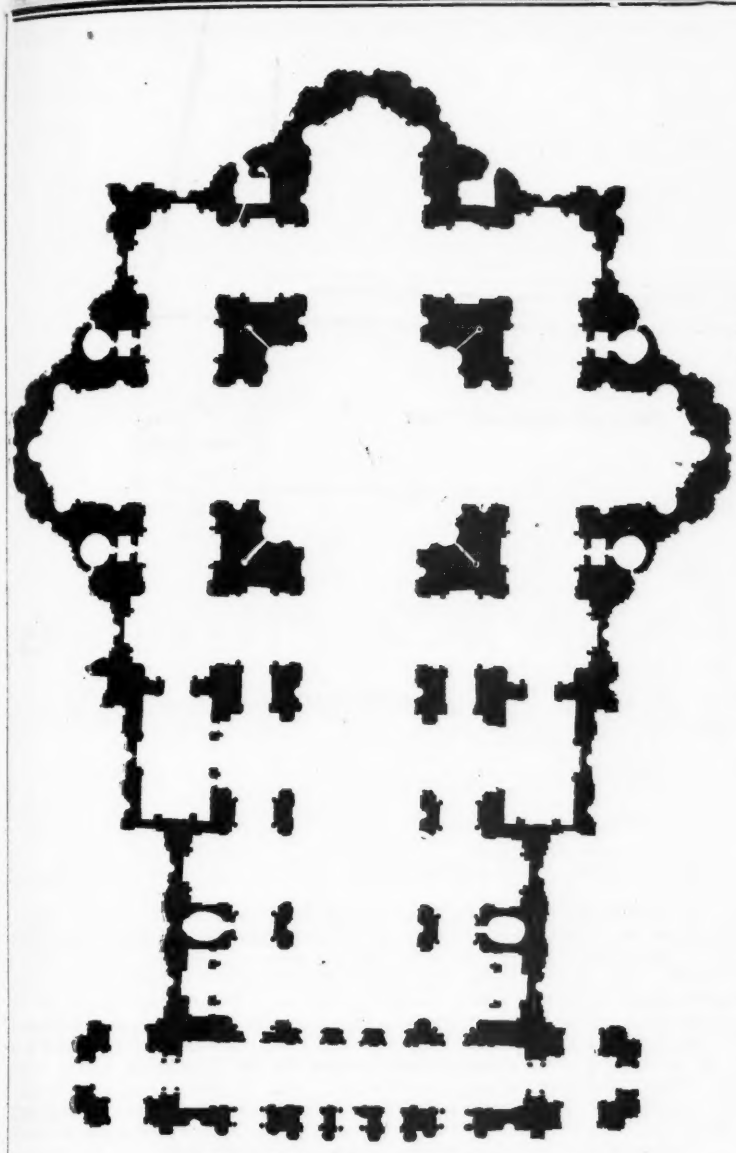
A great discussion is taking place between the town of Paris and the State concerning the demolition of the fortifications of Paris on the west and north of the town, from the Porte d'Auteuil to the Porte de Pantin. The operation, which will in all probability soon be put into effect, will result in an immediate loss to the town of somewhat over four million sterling; there will be 500 acres of ground, now occupied by the fortifications, to be purchased from the State at a cost of eight million pounds, the saleable value of the freed ground being estimated at about four million sterling. This will, however, be a great opportunity for private speculation, and some fortunes will probably be made over the future operations.

It is proposed to add to the present National Manufactory des Gobelins, the large old building which was erected in the fifteenth century, and which once sheltered the working artists who gave the name of Gobelins to this style of work. The building, known under the name of Atelier de la Reine Blanche, stands in the middle of a large piece of ground near that of the present manufactory. The addition of the original building to the present manufactory would be most advantageous, as its enlargement is much required; it would also save from destruction a building of historical interest in the arts of France.

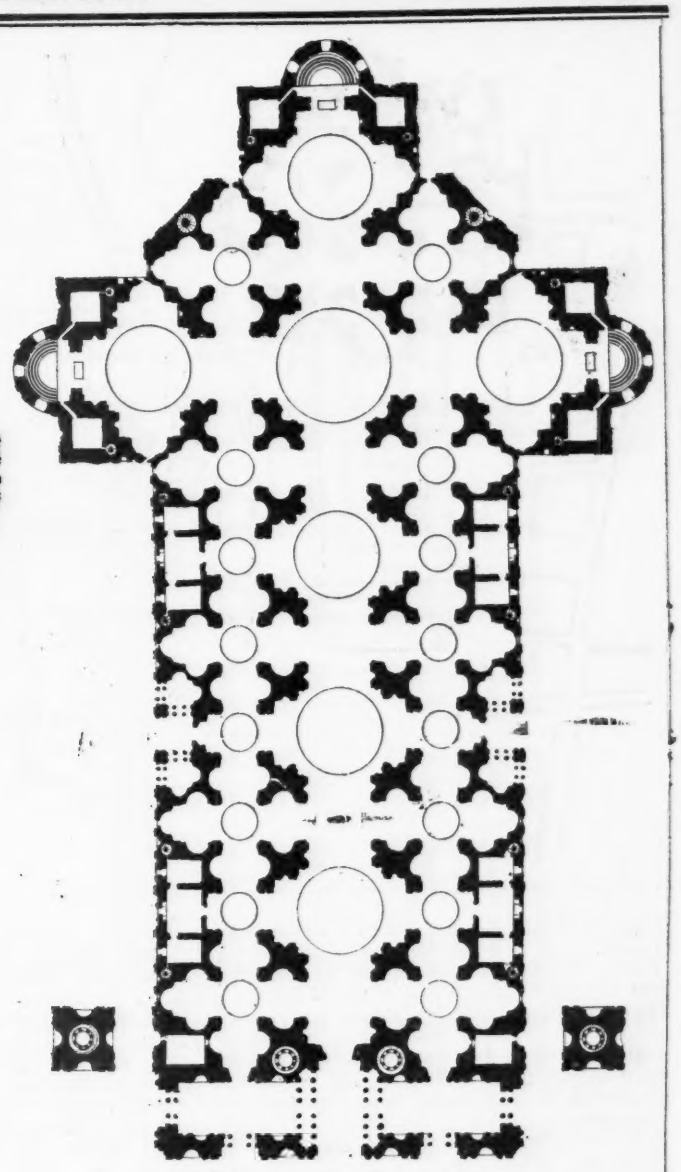
A new and interesting scheme for the utilisation of the ground occupied by the Cirque des Champs Elysées has been brought up by MM. Detaille, Gérome, Flameng, and Robert Fleury. They propose to construct thereon an elegant pavilion, the design for which would be entrusted to M. Girault, the architect of the Petit Palais of the Champs Elysées, and utilise the new building for the annual Salons of the French artists. At other times this "Palais des Artistes" would be available for concerts and other entertainments.

The Société des Artistes Français (Old Salon), after its internal dissensions during the last few weeks of last year, has at last appointed its Council. In succession to M. Jean P. Laurens, who resigned, they have elected as President M. Bouguereau, who, as far as art is concerned, does not exactly represent modern progress. Of course, it is a question not only of artistic but of administrative capacity, and we do not yet know what may be M. Bouguereau's qualifications in the latter sense. He is the fifth President of the Société, which commenced its career under the able directorship of the venerable M. Bailly; to whom succeeded M. Bonnat, followed by M. Detaille and then by M. F. P. Laurens. A sculptor and an architect, M. Bartholde and M. Scellier de Gisors, have been elected Vice-Presidents. M. Albert Maignan will fill the office of Secrétaire Rapporteur, with the assistance of M. Vibert (painter), M. Georges Lemaire (engraver), M. Pascal (architect), and M. Mongin (etcher). M. Boisseau, the sculptor, will continue in office as treasurer. The architectural sub-committee is composed of M. Adrien Chancel and M. Formigé. In the various separate sections, M. Henner will be president for that of painting, M. Frémiet for sculpture, M. Morot for engraving, M. Alfred Normand for architecture, and M. Gardet for decorative art, for the ensuing Salon.

Whether the new appointments will put an end to differences and dissensions remains to be seen, but it is considered rather doubtfu



*Plan of St. Peter's (no scale).*



*Fra Giocondo's Plan for St. Peter's.*

and the proposal for a new building for exhibitions on the site of the Cirque des Champs Elysées, already referred to, looks like a threat of a rival exhibition. The Municipal Council has pronounced no definite opinion as yet, but it is understood to be favourable to this scheme partly because it is expected that M. Girault, the proposed architect, will have an opportunity to produce another very beautiful building. There will also be the advantage of having a concert-room for Paris in a central position; an addition very much needed, for that at the Trocadéro is both inconvenient in position and very bad in an acoustic sense.

The Champs Elysées, which would gain a new attraction by the realisation of the above scheme, is in fact much in need of a new laying out, for it has suffered terribly from the exigencies of the great exhibition, for the sake of which many fine old trees have been sacrificed. As soon as the favourite promenade of the Parisians has been restored to its usual condition, the administration will select a site for the erection of the fountain in ceramic ware which the Sèvres manufactory had erected on the Esplanade des Invalides, and which, when surrounded by trees and flower borders, will have a charming effect. It is proposed also that the portico in ceramic ware erected by Sèvres on the Esplanade shall be rebuilt either in the square of St. Germain des Près or in that of St. Laurent.

M. Guadet, the architect of the Theâtre Français, has placed under the arcades of the Palais Royal, at the entry of Rue Richelieu, four frames of white marble in which will be placed medallion portraits of Racine and Victor Hugo by M. Barrias, and similar portraits of Corneille and Molière by M. Denys Puech. On these four frames will be engraved inscriptions recording the vicissitudes which the Theâtre Français has passed through, having been built in 1782 from the designs of the architect Louis and afterwards four times restored—in 1798 by Moreau, in 1822 by Fontaine, in 1864 by Prosper Chabrol, and in 1900 by M. Guadet.

The "Société des Miniaturistes et Enlumineurs" has opened its sixth exhibition in the Georges Petit Gallery. Among the best works may be named those of Mdmes. Debillemont, Chardon, Marguerite Delaroche, and Camille Isbert, and those of MM. Guinier, Callias, and Zier. The annual exhibition of the Cercle Volney has also opened its doors. We need say nothing of the amateur artists who, in their quality of members of the club, indulge unfortunately in the right to exhibit a great many bad pictures. But there is a fine portrait of a lady by M. Humbert, a head of a Patrician of the sixteenth century by M. Benjamin Constant, other good works by MM. Cayron, Zeviller, and Albert Laurens, sea-pieces by MM. Gustave Garaud and Gransire, a fine landscape by M. Adrien Demont; and in sculpture, a beautiful figure of Joan of Arc by M. Levasseur, and some fine busts by M. Puech.

The death is announced, at age of 47, of M. Joseph Armand Olive, member of the Société Centrale des Architects of the Caisse de Defense Mutuelle. He was the son of a talented architect, M. Joseph Olive, who died only two years ago at Antibes. After having studied at the Ecole Centrale des Arts et Manufactures, Armand Olive was attached to the Orléans Railway Company, at Rouen. He subsequently studied architecture under his father and under M. Bénard, and since 1880 took part in important works at Paris and in the provinces. He was also professor at the Ecole Professionelle de la Papeterie and at the Association Philotechnique; and was the author of an able treatise on hydraulics.

PORTMAN CHAPEL, BAKER-STREET.—On January 24 this chapel, which is one of the oldest existing proprietary chapels in London, was consecrated by Bishop Barry, Rector of St. James's, Piccadilly, as St. Paul's Church, Portman-square. The church and its site have been bought for 8,000*l.* from Lord Portman, who contributes 3,000*l.* towards the endowment fund, and are now conveyed by the Trustees to the Ecclesiastical Commissioners, who have assigned to the church a district taken out of the parish of St. Marylebone

## FIRST ROYAL ACADEMY LECTURE ON ST. PETER'S.*

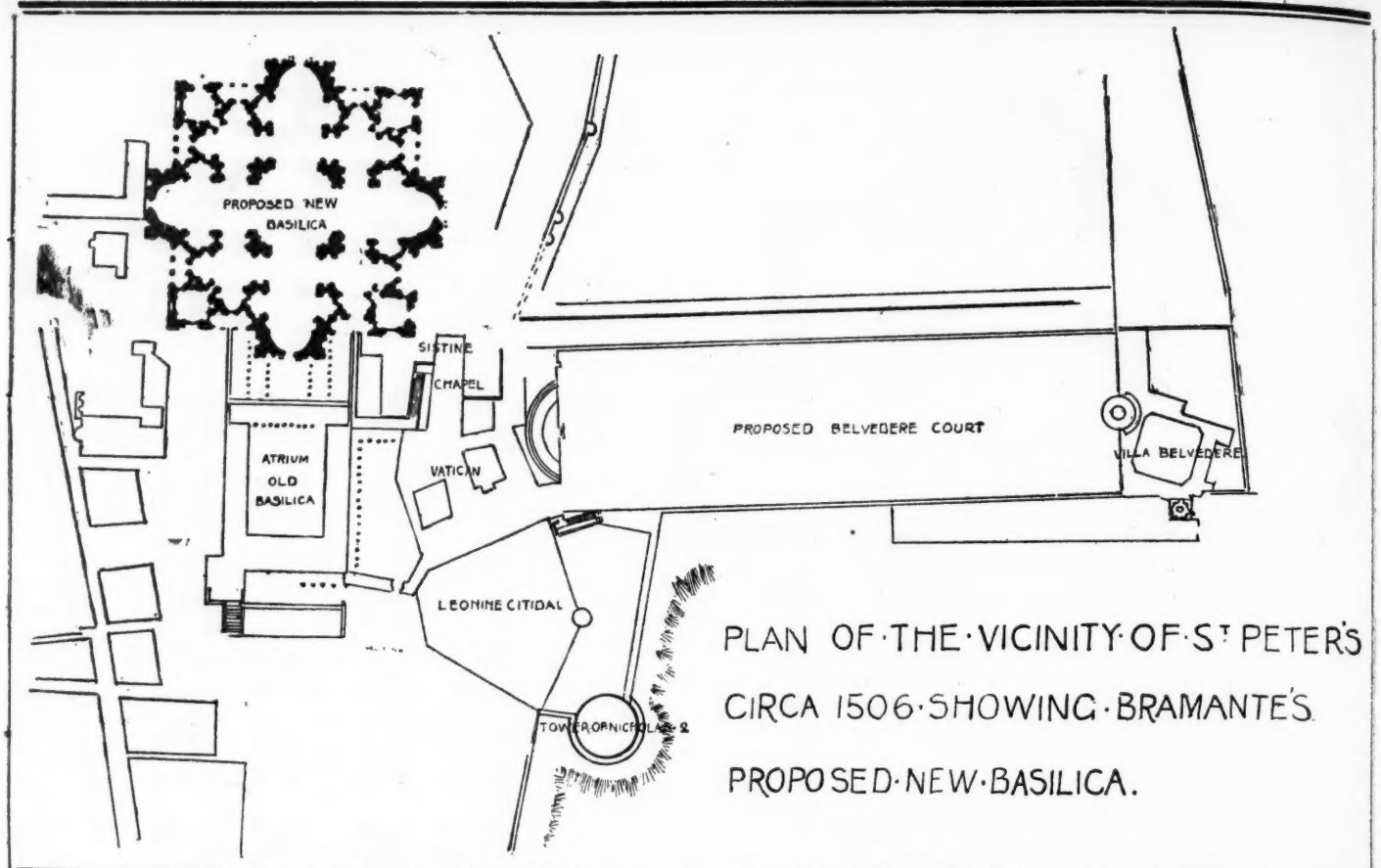
THE name of St. Peter's conjures up visions of the various impulses that were acting on mankind, when its first stone was laid by Julius II. in 1506, impulses that were dispelling the clouds of ignorance, breaking the fetters of habit and authority, and were again impelling mankind to dare to think, to reason, and to act on the results of that reasoning. Directly mankind began to turn their attention to Nature they found that it was only by observing phenomena and reasoning upon them, that discoveries could be made. This new attitude of men's minds was properly called the "Renaissance" or new birth of man's desire to use his intelligence how he liked. In the steamboat, the railway, the telegraph, the electric light and power, in chemistry and photography, we see some of the results.

Peace, comparative freedom and security had brought plenty, and must have had some effect on men's minds in Italy or in Tuscany at least, but the main reason of this new birth was the increased study of the Roman writers and the finding from them that all they knew was learnt from the Greeks, so that the Italians began to study the Greek language, till it was the mark of a neglected education not to be able to speak it—the study of the Roman and Greek literature and of Greek philosophy sometimes in a Roman dress, as the theories of Epicurus in the poem of Lucretius, "On the Nature of Things" ("De Rerum Naturâ").

So great was the effect of this new birth on men's minds and such hopes did it give them, that a tyrant like Sigismund Pandolfo Malatesta sent to the Morea for the bones of Gemistos Plethon, who had taught the Italians Greek, and after putting them and those of some other distinguished humanists into sarcophagi he enshrined them in his temple to Isotta at Rimini.

The Italians had learnt from their studies that the ancients were free to pursue any

* By Professor Aitchison, R.A.




studies that they chose without blame or hindrance, and to indulge in all earthly enjoyments. They saw that Alexander the Great had conquered much of the world known to the ancients, and that the Romans had a large part of the earth for their empire, and hoped that by rivalling the Romans in the fine arts they might restore to Italy the power and dominion it had under the Romans, and consequently they were on the tiptoe of expectation of enjoying the fancied elysium of the ancients. When I speak of the Italians, as a rule I mean the Florentines, and those from the cities of the Val d'Arno, who were the most brilliant and versatile of men. The only man I ever knew that can be compared with these men of the Italian Renaissance was our lamented President Lord Leighton.

I think that another of the causes of this sudden uprising of the human intellect was the long-continued discipline and austerity of the Middle Ages. There was at the Renaissance in Italy an ambitious craving to do something that would give each man an undying name in the career he had chosen, and the possession of this passion carried out to its realisation was called *virtù*, *i.e.*, a clear view of what a man wanted and could do, carried out without regard to anything but success. It had nothing to do with "virtue," for Machiavelli constantly applies it to Cæsar Borgia. This *virtù* was mostly found in Florence. We must, however, not forget that Luther was a German, Copernicus a Prussian, Descartes a Frenchman, Columbus a Genoese, the Cabots Venetians (though Sebastian Cabot was born at Bristol), Prince Henry the Navigator and Vasco di Gama were Portuguese, and we must see that the severe corporal and mental discipline, the restriction, and the austerities of the Middle Ages, though training mankind to suffer and to think, had begot a hatred of these austerities and restrictions that only wanted an example, which was got from Classic literature for all Europe to try and set itself free; and doubtless the Arab centres of learning and the speculations of the Arab philosophers had not a little aided this desire.

About the middle of the fifteenth century (1450-1524) Vasco di Gama found the way to India by doubling the Cape of Good Hope, and gave Camoens the subject for the "Lusiad," while the search for a new way to India led to the discovery by Columbus of the West Indies, in 1492, and he probably saw from his ships parts of North and South America. Amerigo Vespucci, the Florentine, had the good fortune to give his Christian name to the continent, but whether he or Sebastian Cabot saw it first is hardly settled now, though it is generally maintained that Cabot was the first—but this was 1497. The revising of the old astronomy of Ptolemy (139 A.D.), known in the Middle Ages as the "Almagest," by Copernicus (1473-1542), Tycho-Brahe (1546-1601), Galileo (1564-1642), Kepler (1571-1630), and Descartes (1596-1650), ended in the discovery of the telescope and of the real solar system, so that the false theory of the sun and planets going round the earth, which had satisfied the world for 1,400 years, was exploded. Philosophy, too, began to flourish again in the hands of Servetus (1509-1555), Giordano Bruno (1550-1600), to whose memory Mr. Swinburne has dedicated so many of his fine stanzas, and Vanini 1585-1619, and the discovery of the law of gravity by Sir I. Newton, 1642-1727. The study of the Scriptures in their original tongues, the sale of indulgences, and the scandalous lives of some of the clergy at Rome, gave rise to the Reformation; while the new art of printing with movable metal type, and engraving on copper, made knowledge much more accessible.

The human imagery in the Romanesque and Gothic buildings had long before been improved by Niccola Pisano (1205-1277) in the thirteenth century, from the finding at Pisa of a finely-sculptured Roman sarcophagus, which he studied and imitated, whilst in the same century Margharitone (1212-1289), Cimabue (1240-1300), and Giotto (1276-1336) began to give vitality to the old Byzantine painting. The perfection of form in painting and sculpture was brought about by the great artists learning that the ancient masters produced classic perfection by the judicious selection from many models, but whether the Renaissance artists learned the secret from the numerous pieces of sculptured marble and bronze dug up, and from engraved gems found or brought from Constantinople, or from the statements of Aristotle, I know not. Our own art of architecture was made more simple, more refined and elegant, by the infusion of Roman methods by Brunellesco and his followers, though from that day architecture has but slightly advanced, and this advance has not been organic. In other pursuits the advance has been astonishing and marvellous, and continually progressing, while architecture is getting worse, for it was put in the same fetters from which all other efforts of the human mind were set free; before that time in the Middle Ages it had been one of the expressions of the human mind that was free, if not the only one, and we see what freedom then did for architecture in the sumptuous Romanesque monuments and in the marvellous Gothic creations.

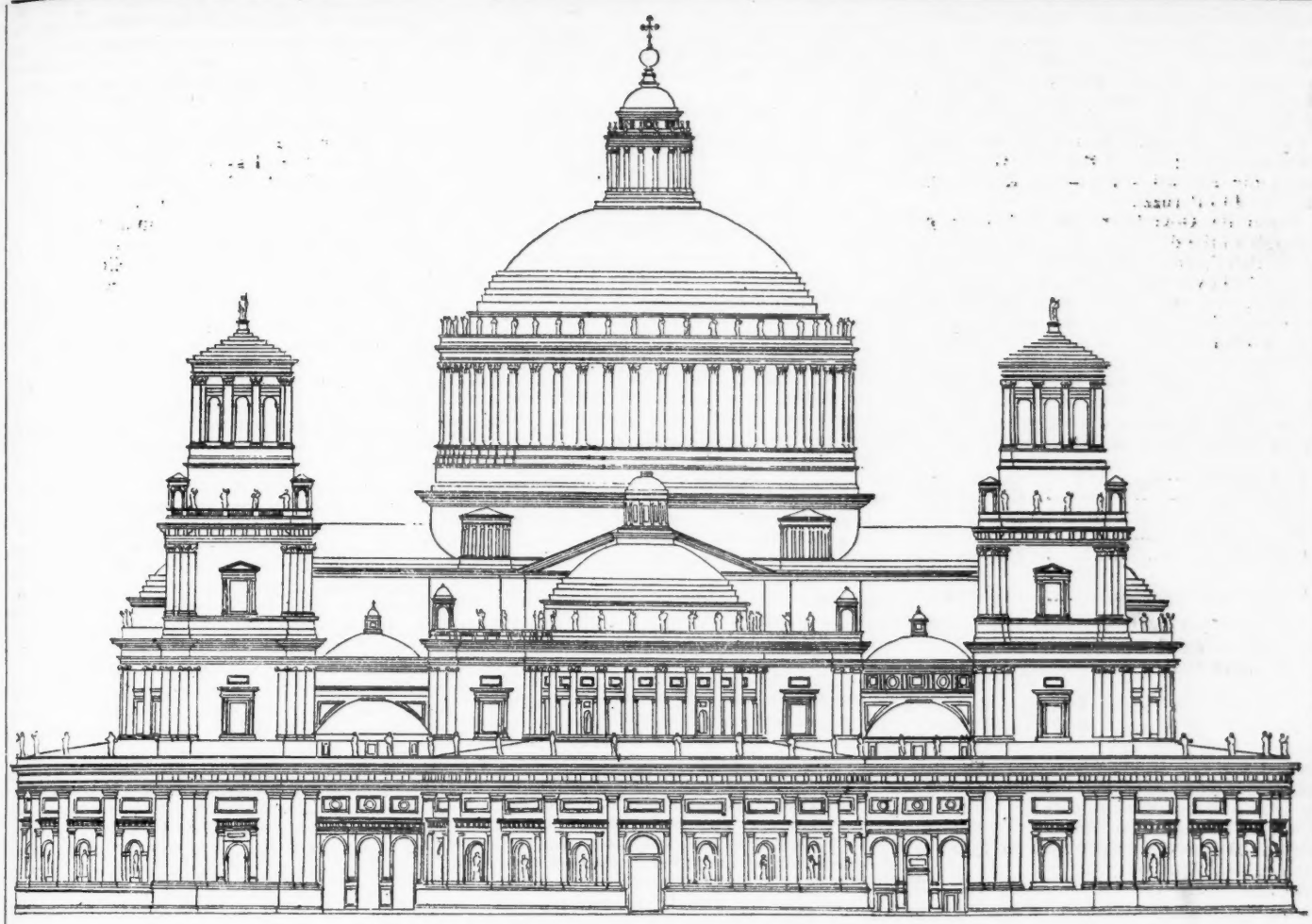
I think it may be agreeable as well as useful to you if I give you a description of the Renaissance basilica of St. Peter's at Rome, with some critical remarks upon it, for it has many claims to your attention. It was begun in the full tide of the Renaissance, at a time when the Papacy was at the height of its power, by Bernardo Rossellino, in the days of Pope Nicholas V., who died in 1455, and was again carried on by Bramante, under Pope Julius II. in 1506. Enormous sums of money were collected to defray the cost of the building from the several countries of Europe, possibly from North and South America, the Islands, and India as well. The most celebrated architects, artists, and amateurs of Italy were consulted about carrying out Bramante's design, and several of the same men were engaged on the actual work. It is, I believe, the largest Christian cathedral in the world, is decorated with the most costly materials, while its dome has been looked upon as one of the wonders of the world:—

> "But lo! the dome, the vast and wond'rous dome,
> To which Diana's marvel was a cell."
> ("Childe Harold," canto iv., stanza 153).

This dome of St. Peter's is visible from Tivoli to the naked eye. The cathedral, too, has the most grandiose approach of any building in Europe.

Every architectural monument must necessarily be interesting to man, for it is built by man for man, in the hope of raising those emotions which are proper to its destination; monuments that are colossal affect him unconsciously by their size, and when he reflects he must be impressed by the daring conception, and by the thought, skill, and labour expended on them; and when in addition to this, the monument has a vast dome rivalling a small mountain, it arouses in him still more wonder at the skill required to make such a mass of heavy material soar in the air. And yet, after having climbed those hundreds of steps that lead from the pavement of St. Peter's to its masonry roof, you feel as if you were walking on the solid ground, while the dome before you is the largest that has ever been raised to that height from the ground, and when you have climbed the steps that lead you to the lantern and look through the eye of the dome on to the pavement below, the worshippers look like ants, while on a clear day you can see from its brazen ball the blue Tyrrhenian sea, and the Campagna with its towns and villages spread out like a map.

Constantine the Great had the first basilica to Saint Peter built on the ruins of the circus of Caligula restored by Nero, and his architect used the place once occupied by the seats on one side as the foundation of the outer wall and the two adjacent aisles of the basilica Bramante got two of the piers to support the



*Elevation of Bramante's Design for St. Peter's, as restored by Baron de Geymüller.*

dome on the same foundation, knowing that the Romans always put excellent foundations to their buildings.

In the days of Pope Nicholas V., who was elected Pope in 1447 and died in 1455, whose name was Tommaso Parentucelli, and who was born 1389 and died 1455, the old basilica was dilapidated, and he was of opinion that a more magnificent basilica should be raised in the centre of Christendom, partly for holding a greater crowd of worshippers and partly to show the great skill the Italians had attained in the fine arts. The Pope was acquainted with Bernardo Gamberelli, a celebrated Florentine sculptor and architect, who was known as Bernardo Rossellino (1409-1464). He worked with the great Leon Batista Alberti, and executed the beautiful tomb of Leonardo Bruni in Santa Croce, Florence, of which there is a cast in the South Kensington Museum.

Bernardo Rossellino designed a new St. Peter's for Nicholas V., but the foundation of the original apse only was executed, and that is all of Bernardo Rossellino's architectural work for St. Peter's that I have ever seen drawn, except the plan of it in Baron de Geymüller's book, "Les Projets Primitives pour la Basilique de St. Pierre de Rome par Bramante," on which Bramante had worked, and, in fact, until his designs have been found we must consider Bramante's as the first design. According to the Baron H. de Geymüller, who believes himself to be the only writer of a life of Bramante who had seen all his works, it was Bramante's boast and not Michelangelo's that he would put the dome of the Pantheon on the vaults of the Basilica of Maxentius. The vaults of the Basilica of Maxentius were of the greatest span, and the Pantheon was the largest dome then known to the Italians, so you will find 83 ft. a span that the Tuscans tried to equal, and the dome of the Cathedral at Florence, a little less than the Pantheon, always aimed at in the revived Roman of the Early Renaissance.

Bramante's name was Donato Bramante of Urbino, and he was born 1444 and died 1514, aged seventy. He was a compatriot, some say a relation, of Raphael. As the first stone of the present basilica was laid by Pope Julius II. in 1506, Bramante had only eight years at the end of his life to complete his design and to see it carried out, and in the latter part of his life he had palsy; but even that was only one of the misfortunes that happened to him. His plan was a Greek cross, which met with opposition in favour of the Latin cross, and no doubt there were other objections, both artistic and ritualistic, and most of the architects, artists, and amateurs, gave sketches or models of their own. We can but regret that Bramante did not have a complete set of drawings and a perfect model made to show his original design, as he was undoubtedly the greatest architect of the Renaissance. The Pope forced Michelangelo to have a perfect model made of his dome, and one is still in the model room at St. Peter's, showing the iron ties to the buttresses, but I cannot say if it is the original.

I was bound to try to give you some sketch of the state of men's minds when this great work was begun, and it would have been interesting to the architects to hear the complete history of this building, if only to show them that we are not the only men who have been harassed and thwarted, but that our forerunners and betters have even been worse treated; but to write a history of the designs and execution of St. Peter's would take at least ten years to read up, as the sources of information are contained in works not to be numbered, and often a whole book has to be read through to furnish a not very important passage on the subject. We ought, therefore, to be thankful to Baron de Geymüller for the immense pains he has taken to give us a complete life of Bramante, of his work on St. Peter's, and the influence he exercised on succeeding architects of the building and on Europe generally, and to Letarouilly for his "Vatican."

The present basilica is externally of travertine stone, its front consists of a Corinthian tetrastyle portice, with a pediment and two bays beyond on each side, finished by deeply projecting pilasters, and beyond an archway at each end flanked by a pilaster. Between the columns a wall is built up so as to leave only three-quarter columns with windows on the first floor, with balconies, from one of which the Pope's blessing is given, the whole front is crowned by an attic with windows. The front is by Carlo Maderno, and is said to be 379 ft. long and 148 ft. high. On the pedestals of the crowning balustrade our Saviour and the Twelve Apostles stand, each statue being 18 ft. 6 in. high. The narthex is 468 ft. long, 50 ft. wide, and 66 ft. high. On the pavement of the nave of St. Peter's, its length and that of some of the principal cathedrals and churches of Europe are given:—St. Peter's, total length 613 ft. 6 in.; width of nave 87 ft. 6 in.; width of aisles 33 ft. 9 in.; St. Paul's London, length 520 ft. 6 in.; Milan Cathedral, length 443 ft.; St. Paul's, Rome, length 419 ft. 3 in.; St. Sophia, Constantinople, 366 ft. 6 in.; length of transept of St. Peter's 446 ft. 6 in.; the height of the nave of St. Peter's by the door 152 ft. 6 in.

The dome of St. Peter's is said to be 139·3 ft. inside diameter, height from pavement to base of lantern 405 ft., from pavement to top of cross 448 ft.

Although the present basilica of St. Peter's was begun in the time of Nicholas V. who died in 1455, nothing of what B. Rossellino designed except the foundation of the choir remains, and the present one of Bramante may be said to have been begun in 1506 by Julius II. when he laid the first stone. The basilica was consecrated November 18, 1626, by Urban VIII., being 120 years from the laying of the first stone by Pope Julius II.

During this time there were twenty Popes: Julius II., Leo X., Adrian VI., Clement VII., Paul III., Julius III., Marcellus II., Paul IV., Pius IV., Pius V., Gregory XIII., Sixtus V., Urban VII., Gregory XIV., Innocent IX., Clement VIII., Leo XI., Paul V., Gregory XV., Urban VIII.

St. Paul's, London, only took fifty-eight years and was under six sovereigns; and we may be thankful for one good action of James II.—he preserved us from Wren's original design. Although Wren was bitterly assailed by pamphleteers, he was enabled to carry out successfully his second design.

That pinchbeck Michelangelo, the Cavalier Giovanni Lorenzo Bernino, by the order of Pope Alexander VII., surrounded the square in front of St. Peter's with those porticos that form so grandiose an approach to it, of which I shall say something hereafter.

As Bramante died March 11, 1514, from at least that date all personal work must have ceased, and every intention of his must have been gathered from the drawings and models he left, and any of his merely verbal communica-

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tions must have been learnt from his assistants, pupils, and friends. Raphael was both a pupil and a friend, and Bramante expressed his desire to Pope Leo X. that Raphael should be entrusted with carrying on the work on account of his mastery of construction. All we know of Raphael as an architect is the Pandolfini Palace at Florence, which he is supposed to have designed; and, if Baron de Geymüller is right, the Farnesina Palace at Rome, usually attributed to Peruzzi.

Baron de Geymüller has not only gone through all the drawings, sketches, and models of St. Peter's he could find in Europe, but has also looked over the sketches of the artists who visited Rome, and who have shown the works at St. Peter's in progress, and has given us as well a plan showing what each architect has done, and I presume when the architects were known and their work is not recorded by him on his plan, the work done did not materially alter Bramante's arrangement, for he only shows the work of the following :—

| | |
|---|---|
| B. Rossellino..... | 1450 |
| D. Bramante..... | 1506 to 1514 |
| Antonio da Sangallo ..... | 1516 to 1546 |
| Michelangelo ..... | 1547 to 1564 |
| Carlo Maderno..... and Giovanni Lorenzo Bernino.. | 1607 to 1622 1626 to 1680 |

Fra Giocondo and Giuliano da Sangallo were appointed to assist Bramante during his illness —November 1, 1513, and January 1, 1514—and after his death on March 11, 1514. Raphael and Giuliano da Sangallo replaced him as architects at St. Peter's. Giuliano da Sangallo retired July 1, 1515, and Fra Giocondo died the same day. The four piers of the dome were built and vaulted over, and had at least a pendentive up to half the circle in the pendentive, as shown by Martin Heemskirk's sketches, dated by Baron Geymüller 1520 to 1536; and Raphael died April 6, 1520.

As illustrating the extraordinary versatility of the artists of the Renaissance, there is a story told about Giuliano da Sangallo, who was a carpenter by trade, which then involved the carving of wooden statues and the inlaying of wood with lighter or darker wood in ornamental patterns, which had just become the fashion, and Giuliano was famous among his fellow-craftsmen as the best hand. The stalls were being put up in the cathedral of Florence, and Lorenzo the Magnificent used to look in at the work after his dinner, and talk to the craftsmen, who said it was a shame that Giuliano Giamberti, the best inlayer, was not employed, and Lorenzo said, "Send him here," and he was employed, and Lorenzo was struck with his cleverness and resolution. One day Lorenzo said to him, "Giuliano, the Duke of Calabria has declared war against me, and is besieging one of my border castles, which I well know is much dilapidated, so pick up your tools, go there, and repair the castle; my gunners, too, are very bad, so when you have repaired the fortifications put my gunners in the right way." Giuliano did so, and when the Duke found the fortifications were repaired and the gunners aimed well he raised the siege. Lorenzo then set Giuliano to supply some town with water, and afterwards got him to design and carry out a monastery outside the Porta San Gallo. Giuliano found in the trenches a Classic Ionic capital of peculiar form, had it copied and used for the monastery, and after this time whenever Lorenzo saw him he called him "San Gallo." The Florentines were proud of their family names, so one day Giuliano said to Lorenzo, "Why do you always call me San Gallo? My name is Giamberti, and I shall lose my family name." To which Lorenzo replied, "This is not losing your name, but gaining a more honourable one for yourself," and after that he and his brother, the old Antonio, called themselves "San Gallo," and their nephew, Antonio Piccone, called himself San Gallo as well.

I give you now some illustrations of St. Peter's, with plans and views of some of the Gothic cathedrals and churches, for you to see how small the Gothic points of support are to those at St. Peter's.

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THE LATE MR. J. BURNET.—A correspondent in Glasgow points out that in the report of the Institute meeting in our last issue we gave the name of the deceased architect as "Mr. J. J. Burnet," whereas the name of the senior of the firm who is dead was Mr. John Burnet. We reported the announcement, however, as made by the hon. secretary, who gave the name as we printed it.

## COLOUR IN ARCHITECTURE.*

THE present paper makes no pretence to be anything more than a starting point for discussion. There are certain features of architectural practice which are of interest, not to architects only, but to the members of the allied professions who co-operate with them in their work. The fulfilment of the task of the master builder involves many subsidiary operations on the part of the carver, the painter, and the decorative and industrial artist in general. Some of this subsidiary work is specially attractive, and is of a kind that appeals with greater force to the taste of the public than the more purely architectural qualities of the whole structure. There is accordingly some danger lest the essentially subordinate character of all this decorative work should be misunderstood, and the predominance of what is architectural in the architectural monument a little obscured. It will be remembered that the late John Ruskin in his "Lectures on Architecture and Painting," and also in the preface to the second edition of the "Seven Lamps," enunciated an extraordinary paradox to the effect that this decorative work just referred to as subsidiary is, in fact, the essential part of architecture. "Artistic and rational admiration" of a building, he stated, "attached itself *wholly* to the meaning of the sculpture and colour on the building. . . The fact is," he says, "there are only two fine arts possible to the human race, sculpture and painting. What we call architecture is only the association of these in noble masses or the placing them in fit places." No one in the present day regards this famous utterance as anything more than an example of the aberration of genius. This summary condemnation of "what we call architecture" in the preface to one of the most interesting and suggestive books ever written about the art is not accepted even by pronounced Ruskinians; yet there must have been some reason for the assertion, some influence abroad in the artistic atmosphere of the times which suggested the paradox. This influence exists, and is perhaps still more potent in our own immediate day than it was half a century ago. It is the influence of painting.

Painting may mean two things. It may mean colour, or it may mean the life-like presentation of natural objects. It is in the latter aspect that we find it presented chiefly in the writings of Mr. Ruskin, who is possessed throughout with the spirit of naturalism, but in the present day, painting appeals to us not so much as an art of representation as in its more refined manifestations through pictorial effect and colour. In these aspects of it the art of painting is exercising to-day an overmastering influence, in which its only rival is music. It is as pre-eminent in public estimation as it was in the Italy of the fifteenth and sixteenth centuries, and it tends to affect the other arts with a desire to imitate its characteristics. The picture is so attractive in the eyes of the public, that those who serve the public in the other arts of form cannot help trying for pictorial qualities. The strength of the influence of painting on sculpture was very marked in the statuary of the recent Paris Exhibition, and the same influence is by no means inoperative in the case of architecture. Pictorial effect, or what architects call "picturesqueness," is one direction in which this influence is exercised, and another is colour. To aim at a pictorial use of colour in architecture is in accordance with modern tendencies. The fashion of the day tends to the exaltation of the picturesque in the arts generally, and there is of necessity a likelihood that the analogy of painting may be pressed too far, and the canons of pictorial art applied too crudely to the other arts, the principles of which are in many respects essentially different.

This being the case, it may be worth while asking the question, What, after all, is the true place of colour in architecture? It is the aim of what follows to facilitate the discussion of this question by clearing it from some of the confusing side issues which tend to complication, and pointing to some considerations which must form the groundwork of any useful discussion. The main thesis of the paper may be stated for the sake of clearness at the outset. It is argued here that in colour we have an element of architectural effect of great artistic possibilities that is at the same time not an essential element of architectural effect. In other words, colour is not necessary to architecture, though to certain forms of architecture it may add a considerable æsthetic charm. These forms of architecture to which colour is a useful auxiliary are not the highest forms. The nobler the architectural qualities of a monument, the less demand is there for any such adjunct. Architecture, it is maintained, is an art of form, not of colour. All that is really architectural in architecture is form; the only quality that may claim a place beside those of form is not the quality of colour, but that of texture, and texture, as we shall see, is much more inherent in a fabric than colour. The architect who is to lift his art in the present day to the level, say, of the art of Wren or of Bramante should stiffen himself even into asceticism in the resolve to make his work primarily architecture, not painting; that is to say, a great austere art of form, expressing itself in imperishable stone, not a lovely and attractive toy, however gaily dressed in the hues and shimmer of pigment or of gold. At the risk of seeming to burden the paper with too much theorising, we may devote a few moments to the fundamental question, What are the essential elements of architectural effect? What qualities must a structure possess before we can term it a work of architecture? Mass is, doubtless, the first element to notice, but this it is not always possible for the designer to secure. The grandeur gained by imposing size, the sort of grandeur which is the primary impression one receives from the exterior of Mr. Bentley's new cathedral at Westminster, is not always within the architect's power to compass; it depends on the nature of his task and the resources of his clients. The element next in order—proportion or composition, *i.e.*, the subdivision of the mass and the grouping of the parts according to an artistic scheme—is in the designer's own hands, and if he fails here nothing can really save him. It is the chief artistic function of the architect so to distribute the spaces of his building that its outward show may satisfy the eye with a fine æsthetic effect of proportion and grouping, and great success here, as in the case of Sir Christopher Wren, lifts the artist at once to the highest rank among his fellows. This is, however, not in itself enough. To subdivide a mass and group its parts and its openings in pleasing relations is not enough, if the parts are mere plain parallelopipeds and the openings are bare unframed holes cut in a wall. A certain apparatus of minor features is requisite for the purpose of lending accent and significance to the divisions, and doing all the artistic service to the structure which can be rendered by frame, or border, or plinth, or cresting. The most important of these features is the moulding. Mouldings explain the use and significance of a fabric by emphasising its parts and divisions, which all depend on the purpose it has to serve; they clear the construction by the accent they throw on points of junction, on base or crowning member; they minister to beauty through their aid to composition in linking or in severing part and part, in framing the naked aperture, in enriching by repetition in bands of light and shade the pleasing or significant line. Without these features, of which the moulding is the chief, the structure cannot be artistically set off and clothed, and without the aid of these the æsthetic effect of architecture cannot be fully obtained.

It is maintained here that the qualities just indicated are all that are *essential* to the æsthetic effect of architecture, and that no further element, such as the element of ornament or of colour, is really needed. That a building without ornament or colour can give the full impression of architectural beauty is perhaps a hard saying, and many would hesitate before surrendering as non-essential these attractive features. Wren's work, however, brings the matter to a practical test. There is no colour and very little ornament—and this all of a commonplace kind—on Wren's City churches; but do they on that account take a lower architectural rank than would otherwise be the case? Where is the decoration or colour on the High School at Edinburgh, or on the east front of the Old University? Robert Adam designed for the latter decorative sculpture in the form of colossal statues on the balcony above the columns of the portal, but they have never been added. Is the building architecturally any the worse for their absence?

* A paper read by Professor Baldwin Brown at a meeting of the Edinburgh Architectural Association on January 16.

The Greek temple at Pæstum in Southern Italy exhibits now no ornament or polychrome decoration, yet it is one of the most perfectly satisfying structures to the architectural sense that the world has to show. Among mediæval buildings there is a very conspicuous test-case which gives us a definite issue. The two churches of S. Marco at Venice and St. Front at Périgueux in Western France are curiously, though only accidentally, alike in form, but no difference could be more striking than that between the artistic effects of the two interiors. In S. Marco, golden domes are upheld on jasper walls, and hang over a pavement fretted with the glowing tints of oriental marbles. The effect of colour is of a sumptuous richness elsewhere unrivalled. In contrast to this the interior of St. Front is one of puritanic plainness. There is absolutely no colour, and hardly a touch of ornament. All is pure form, and dependent for its æsthetic effect on the most austere architectonic beauty. Yet let us hear what is said about St. Front by the authors of the recent monumental history of ecclesiastical architecture in the West. It is one of the few buildings about which these writers kindle into something like enthusiasm. "In all the world," they exclaim, "there is no architectonic creation that in pure beauty is its equal. . . Here is architecture in the absolute, disdaining all collaboration of the decorative arts. One or two unpretending pilaster-caps, only what is barely necessary in the way of mouldings to mark the line of springing of the arches—that is all the detail ; it is probable that no provision was ever made for adornment in colour. The builder has given himself over entirely to his artistic sense of form, to a harmony of clearly defined proportions that carries its own sufficiency with it. One can linger long in this incomparable interior without ever becoming conscious of its entire bareness of decoration, and when we do feel this, it gives us no sense of poverty, but only of the inevitable. This austere artistic realism strikes us with all the more admiration in that it lifts itself to its lonely height out of an age that delighted above all things in decorative variety, in show and glitter, in childish pleasure of the eye. The unknown master of St. Front possesses in all the wide field of architecture only one compeer of equal mind, the great Bramante. To Bramante, also, the architectonic idea presented itself in such purity, that all ornament seemed to him a needless parade, and of artistic details only such were allowed as seemed necessary for the earthly clothing of the Ideal."*

If there is any element of architectural effect after composition and details that may claim to be of the essence of the art, it would not be decoration nor colour, but surface-quality or texture. The surface of a building material should be so handled as to express the character of that material, and it derives from the intrinsic excellence of the material thus expressed a certain æsthetic value. This value is enhanced when the history of the fabric has been written there by the caressing fingers of time, and the surface has gained that expressive play of light and shade which makes a bit of Greek or mediæval walling in itself a thing of beauty. But building materials to have beauty of surface-texture need not be weathered. The Parthenon must have had this beauty when quite new, for the surface of the finely dressed but unpolished marble was an index to the quality of the material. Here in Edinburgh, look at the half columns on the two buildings on the east side of St. Andrew-square on either flank of the forecourt of the Royal Bank. They have been there for a hundred years but time has not corroded them. A mellowing influence it may have exercised, but the surface quality is still the outward expression of that molecular structure on which the excellence in a utilitarian sense of the building material depends. Or, to take a London as well as an Edinburgh instance, we may note the surface quality assumed by Portland stone in the atmosphere of the metropolis. The alternation of a greyish white and rich sooty black on the exposed and protected planes is singularly telling, and St. Paul's, St. Martin's-in-the-Fields, and other structures in this material owe not a little to this effective peculiarity. Why other building stones should in the London air degenerate to a lifeless mud-colour, and the Portland stone tell out to all time so bold and bright, I do not know, but the phenomenon seems characteristic of the material, and as such is its expression—an outcome of its inner constitution, in virtue of which it becomes the trusted vehicle of the architect's highest conceptions.

This texture is thus a noble and expressive æsthetic quality, very near to the essential character of architecture. It has been necessary to dwell upon it because it is often confounded with the quality of colour, with which, however, it has only an accidental connexion. It is true, of course, that most materials weather to colour as well as to beauty of surface. Owing to the fact that Pentelic marble contains minute particles of iron, the old Athenian buildings have assumed in time a rich golden hue, now known to be nothing more nor less than rust ; and every one has admired the beautiful tints of old tiles and brickwork in our own domestic architecture. This is, of course, in the nature of a happy accident, not a piece of calculated effect. The case is different when certain materials have from the first inherent beauty of tint. To build with such, is necessarily to build with colour, and the element of colour comes here inevitably into view.

The general tint of a building stone, the hue of brick or tiling, undoubtedly count for a good deal in architectural effect ; and where two materials are equally good from the tectonic point of view, the one with a more pleasing colour is immeasurably to be preferred. The Redhall stone, so much used in the Edinburgh buildings of three generations back, has at times a beautiful golden hue, which certainly accounts for part of the architectural charm of the north side of Charlotte-square or the Register House. The cold grey of the same material from other beds, as seen in the High School, is in itself, perhaps, a little less pleasing. But would any practical architect be so far affected by this as to reject the grey Craigleith sandstone for an inferior substance of a warmer hue, like the reddish stone now so much employed? Surely the harder, more durable, and in every way finer material would on architectural grounds be preferred ? In like manner would any London architect who could build in Portland stone reject it because of its coldness of hue, or in monumental work prefer brick to stone because of its warmth of colour? The gleaming white stone so much used in Paris, as in the effective exterior of the new Orleans railway station, is a beautiful material though entirely colourless. The inherent colour of a material is not, like texture, an index to its actual constitution. It is more of the nature of an accident than the outward expression of structure, and ranks lower in architectural importance than texture. A good building material will look well and weather well but need not be of any distinctive colour. Only when other things are equal should considerations of the colour of a material influence the choice of it. If, as is here contended, the architect who has a sense of the monumental will choose his stone or bricks primarily for their characteristics as building materials, and only in a secondary sense for their colour, then colour even in this most natural form of it is acknowledged to be a non-essential, though a valuable, quality.

We pass now from colour inherent in materials to colour deliberately applied either as incrustation or in the form of pigment.

There will rise up here before the mind's eye, like fairy pavilions at the wave of a genie's wand, a crowd of lovely structures, old and new and of every land, of which colour is the distinctive charm. Colour in paint or inlay or panel or film of gold glances and glows from them all. There are the pylons of Egypt gay with painted figures and picture script ; the stuccoed walls of Babylonian palaces encrusted with enamelled tiles ; the Mycenæan house that sparkled with metal appliques and inlayed pastes of oriental blue. The Greek temples were not pure white, but were pranked with coloured guilloche or fret and with golden stars on roofs of skyey blue, and threw up their decorative sculpture from a background of full vermilion or ultramarine. The huge Alexandrian piles of brick and concrete were faced with veneers of oriental marbles of every hue, and the same materials, sawn out of every outland quarry, shone on the walls and pavements of Imperial Rome. The new Rome of Constantine rears above her varied marble walls domes all opulent within with golden mosaics, while the Early Christian artists of Ravenna with finer taste relieve against a background of blue their stately pictured forms of Apostle and of Saint. While the Byzantine tradition of colour, mingling with old oriental elements, kindles the golden lights and fires the deeper gules and azure of the fretted Moorish roofs, and further east the glories of Babylon are revived in the tiles and inlays of Bagdad or Ispahan, in the mediæval churches of the north the interiors were aglow with paint and gilding in the carved woodwork, and with blood-reds in the hollow of the sculptured leafage and the mouldings, while the windows poured in a coloured light thrown back from the deeper hues of Saracenic hangings between the pillars of the nave arcades. The chapels and the halls of the Italy of the early Renaissance were habited within in every part with mural pictures, framed and extended by well-composed decorative motives. And, apart from these more ambitious structures, what a feast of colours, brilliant or subdued, is offered by the domestic buildings of wood and brick and tiling in all the lands of the North ! Garish on Norwegian or Russian timber-houses, more mellow on the tiled cottage of Surrey or on Scottish harling, the tints of the homely fabrics seem to join with the splendours of church and palace to annunciate the universal rule of colour.

With the flag of colour flying so high upon the mast, how can a reader of a paper before an architectural audience venture to dethrone this element from among the essentials of architectural effect ?

It must be said in explanation that there is no desire here to depreciate in any degree the æsthetic charm of colour. No admiration can be too great for the beauties of colour, sumptuous or delicate, which the various structures just glanced at afford to us. We have, however, an argument in hand and must consider the subject from every point of view. Plato often asks in his dialogues, Whither is the argument leading us ? It is not what we secretly desire to prove that will necessarily come to light. We must follow the argument, and where it lands us we must rest. Now the argument here seems to lead us to a conception of architecture that rises in monumental dignity above the need of these artificial adjuncts, to an art that at its best is an art of form, and only an art of colour when its own best effects are denied to it.

A consideration of the sort of buildings noticed above does nothing to alter this conception. The majority of them are not of the most monumental materials, and the significance of this fact we shall presently see. The Egyptian temple, it is true, was of stone, but the forms of it copied in the crudest fashion far slighter structures that preceded it. The storied wall of the pylon is just a cunningly-woven curtain imitated in stone, just as the columns of the halls within, though of vast bulk, are simply overgrown papyrus reeds without real monumental character. The Greeks, when they petrified the timber and mud-brick forms of their temples, had the wit to stamp upon them an essentially lithic character, so that they not only *were* stone, but *looked* stone. They do not go so far, however, as to abandon the old practice of painting upon them ornaments. The use of pigment in this fashion on the finely grained Pentelic marble was a matter rather of tradition than of artistic choice. We cannot safely found any æsthetic theory as to the colouring of stonework on this feature in Hellenic practice, because the builders of the first monumental temples were in a way forced into this use of colour by its established vogue in the earlier and still common structures in wood and plaster. In the case of the mediæval churches in the lands north of the Alpine barrier, we have no knowledge as to the extent to which colour was actually applied to the exterior. Traces of polychromy on the sculptured figures outside the French cathedrals were observed in the last century, but I know of no other evidence. The details of the interior stonework were certainly often treated to a considerable extent with colour.

With the exceptions just noticed, all the notable instances of polychromy in the buildings instanced are of colour applied in veneers of a rich over a poorer material, or in the form of pigment on to wood or plaster. It is impossible to pretend that the marble veneer—invented, it seems, at Alexandria, spreading thence to Rome and Byzantium, and revived later in mediæval Italy—is a satisfactory architectural expedient. Mr. Ruskin, who was so severe on shams, might have found in the beloved Florence some very appropriate themes

* Dehio u. von Bezold, Kirchliche Baukunst des Abendlandes. I. 337.

for sarcastic comment. Is there any architect whose ambition would be satisfied by building a church with a western façade like that of the Duomo at Florence till they veneered it up a few years ago? Nor is the surface of stucco over rubble or brickwork a very noble form of artistic expression. Buildings of wood, though full of delightful æsthetic character, are not monumental.

The point which emerges here is of the essence of the argument of this paper. From the side of the æsthetics of architecture, and from the side of history also, the argument seems to lead us to the conclusion that monumental stone architecture, where the outward aspect of the fabric expresses the structure, and the surface-quality is an index to the nature of the material, not only does not demand but rather rejects the aid of colour, while, on the other hand, the less noble materials just indicated require, or, at any rate, open themselves to, an application of the kind. If a veneer is used, colour must almost necessarily be considered in its selection. Colour justifies the employment of such incrustation, whereas if used to give the impression of substance it would be a mere fraud, because the actual substance behind it is of quite a different and inferior character. When the material is used primarily for the sake of its fine colour the logic of the situation seems really to require its employment in thin slabs, and so to justify the veneering process. Such fine material is *ex hypothesi* rare, and economy demands that the most should be made of the available supply. Wood and iron or steel when exposed to the atmosphere absolutely need some coating or surface treatment to preserve them, and when this is provided by paint it would be absurd not to take full advantage of the great characteristic of paint, its colour-producing quality. Plaster does not perhaps *need* colour, but in an artistic sense it seems to thirst for it. In dealing with these materials we are at once transported, as it were, into the world of colour, and have nothing further for the moment to do with architecture in the purely monumental aspects with which we have been dealing. We may turn from this ideal of architecture as a pure art of form to consider the application of colour to materials which we can hardly imagine as existing without it. The subject of colour schemes, harmonies of colour and the like, cannot of course be entered on. The considerations with which we are here concerned are prior to all such special questions of artistic judgment.

On the treatment of woodwork a good deal might be said. Wood, like stone, when of fine substance, has its own surface-quality, and one admires it in the rudely-dressed oaken beam of the old-fashioned cottage, as much as in the polished mahogany of a Chippendale chair back. Wood weathers delightfully on exteriors, but its surface has commonly been treated with a drench of some kind if not with pigment. Examples, in our own country and abroad, of the polychromatic treatment of woodwork are too well known to need mention here.

Among metals, bronze or copper and lead may be left to themselves to acquire by time their fine patina, but iron or steel are terribly sensitive to the damp in the atmosphere. Even under the favourable climatic conditions of the drawing-room fireplace, the housemaid has hard work to keep the steel grate up to her ideal of shininess. Exposed ironwork practically must be painted, and the buildings of the two last Paris exhibitions showed some notable examples of polychromy in the treatment of this material.

Of far greater importance is the question of the colour treatment of plaster. As a mere matter of acreage, the surface of plaster, at any rate in the interior of our buildings public and private, is far greater than that of all other materials put together, and its polychromy is one of the most practical of artistic questions.

It has just been said of plaster that in an artistic sense it seems to thirst for colour. What is meant by this will be seen if we cast our eyes backwards for a moment, and take a glance at the past.

In our treatment of plaster we have degenerated from earlier practice. In classical times, when plaster-work, at any rate in its technique, was better than it has ever been since, the application of colour was evidently held to be the normal finish of the plasterer's task. Vitruvius contains a passage on the subject that is of the highest importance and interest. He gives a description of the methods of mixing and applying the successive coats of plaster to a wall—they are seven in number and the last is made with lime and marble-dust, and finally polished till the surface of gleaming white would actually reflect the beholder's face as in a mirror. But the description does not stop here. Vitruvius goes on to represent the painter's work as following at once on the plasterer's, as if the same hand were to be engaged on both. As each successive coat of stucco had been laid on before the previous one was dry, so now the painter must be prepared with his pigments and brushes to apply his colour on the finely-smoothed but still wet surface of the finished intonaco. Granted that all this is deftly done—that the plaster is duly macerated, the coats laid on at the right moments and fairly smoothed, the colours carefully applied the instant the final layer is brought up to its exquisite surface—then will the work abide for ages, the stucco will not blister or crack nor the colours wash off or fade, and the whole will preserve its dainty brightness unroughened and undimmed.

The process Vitruvius refers to is, of course, that known as *a fresco*. It is the most simple as well as the most effective of all processes of painting, and for interiors, at any rate in the form of flat tints or simple decoration if not of the mural picture, there is no reason why it should not be employed to-day as it was of old. If it were an established principle that no plaster work was to be considered finished till it was tinted *a fresco*, what tasteful rooms and staircases we could have at a nominal cost!

There is no painted surface (save, of course, that of a fine oil picture by a great master) so artistic as fresco on well-finished plaster. It does not make a skin over the surface with a streaky texture of its own like the "one, two, or three coats of oil paint" we are so familiar with, nor roughen it up with the surface, pleasing enough but coarse, of distemper. Fresco has its own characteristic semi-lustrous face, but when laid in flat tints leaves to the ground its own proper surface. There is no mystery about colouring in fresco. Here are some bits of ordinary room-wall plaster painted over a long while ago with common earth-pigments, mixed with water alone. There is no binding material or varnish of any sort, yet the wet finger will not bring any of the colour away, and twenty years has brought no change or deterioration. Some old bits of Roman plaster coloured *a fresco* are shown for comparison.

In the Vitruvian plaster work the finely-finished surface of the final coat continued even when tinted to play its part in the artistic effect, for the ancients evidently considered that its polished whiteness would gleam through the transparent veil—it is not a coat or skin—of pigment. This use of the white ground to keep up the brilliance of the final effect is in accordance with those sound artistic traditions which prevailed in the past, so long as the arts and the crafts were one. To carry as much as possible of the value of one process on into the next is a maxim as sound from the point of view of economy as of art. If there are modern decorative painters to whom the plasterer is a servant rather than a fellow-worker, and who get their lights by loading with white upon a heavy bed of pigment they might take a lesson at the hands of the classical frescoist.

The polychrome treatment of plaster culminates in the mural picture, in fresco if possible, but, if not, in some one of the practical modern processes which permit the work to be done directly on the wall. The picture painted in the studio on canvas and then glued on in its place cannot but be regarded as a *pis-aller*, a modern confession of our degeneracy in the decorative art. There can be no attempt to discuss here the special æsthetics of mural painting, its conventions, the extent to which it may admit perspective and light-and-shade naturalism and action, or the relative places in a scheme of the storied panel and the more purely ornamental framing and filling. Only those features of it may be mentioned in which the architect of the building would feel a special concern.

It stands to reason that over all undertakings of the kind the presiding genius must be the architect. He need not concern himself much about the pictorial execution of the designs, but is bound to be greatly jealous in the matter of colour. Where he has gained by the use of his own materials a certain colour-effect he is bound to exact from his decorative painters a due correspondence with it in their own scheme. He has, however, the primary and more essential task of setting out the spaces that the applied polychromatic decoration has to fill. He must assuredly make this part of his design. We have seen already that in the view of architecture taken in this paper, such polychromy is not an essential part of his effect, either on the exterior or interior view. If he chooses to finish interior and exterior alike with fine stonework, expressing in form and texture both the structure of the fabric and the character of the material, then the decorative painter and the inlayer and the gilder have no business in the place. It must be for him to decide what he wants from them, or whether he needs their aid at all. An excellent example of what should always be done in this matter is to be found at the Catholic Apostolic Church in Edinburgh, built by Dr. Rowand Anderson, and now in course of decoration by Mrs. Traquair. Here is an exterior in monumental stonework, with pleasing colour in the material, but without polychromy. In the interior the spaces are mapped out for decorative painting by the use of plaster and the omission of dressed stonework. The painter comes and proceeds with confidence in assured accordance with the main design. Hence when the decoration is finished on wall and roof alike the result will be one of the most complete and interesting works of art that is anywhere to be seen.

A conspicuous instance on the other side is the interior of St. Paul's in London. The difficulty which has been felt here all along, and which is still unsolved, is due to the fact, to which it is no use shutting our eyes, that the designer of the building had no idea of a scheme of polychromatic decoration. He finished the whole of the interior, save the domes of the roof and their spandrels, in fine stonework, and left no hint in word or deed that he ever meant it to be coloured. The domes and spandrels are finished in plaster over brick, and there is distinct documentary evidence that he contemplated painting on the smaller ones, and on the great dome mosaic. Richly coloured Greek marbles we also know were ultimately to be used in the canopy over the altar. In view of the importance of the matter in question, it may be worth quoting the words of the *Parentalia*. On page 291 we read that (under the cupolas of the roof) "the arches and wreaths being of stone carved, the spandrels between" (and of course the domes themselves) "are of sound brick invested with stucco of cockle-shell lime, which becomes as hard as Portland stone, and which, having large planes between the stone ribs, are capable of further ornaments of painting if desired;" while in a note on page 292 we are told that "the judgment of the surveyor" (Sir C. Wren) "was originally, instead of painting in the manner it is now performed, to have beautified the inside of the cupola with the more durable ornament of mosaic." This is really all the encouragement in an affirmative sense that the decorators get from the architect himself, while the walls of the noble church are simply eloquent in their protest against the paint and gilding and marble veneers and stencilling and script, with which they have periodically been threatened in the past, and are now actually attacked. With time, the stone has taken on itself a most beautiful patina*, and is far more lovely to-day in colour than any coating which is likely to be laid over it. It has everywhere, where left untouched, the surface-quality of a noble and efficient material, and it is positive vandalism to overlay this with heavy unrelieved gilding such as is now being applied. The words just quoted from the only authority which exists about Wren's intentions ought to be on this point conclusive. There is a distinction drawn between the carved wreaths which are of stone and the surfaces of plaster. The latter may be painted, but the inference is very strong that the stone wreaths were regarded as needing no such addition.

There are two plausible motives for the treatment now apparently adopted, but it is

* The Portland stone in the interior of St. Paul's has taken upon it a warm but light shade of golden brown, that is not like the usual pale colour of the material when used in exteriors. It is not a uniform flat tint, but is pleasantly varied. Whether this is due to time, to the effect of the London atmosphere, or to the varying treatment it has received in different places in the past, does not concern us. As it is now, it satisfies the eye, and would not be improved by spots of gilding or inlay.

urged here that they have no such validity as to counterbalance the grave objections that exist to interfering with an architectural surface completed by the designer in fine material and never intended by him to be touched. One motive is the very natural ambition to have a rich and sumptuous interior effect. Such an effect is in itself desirable enough, and the builder of St. Paul's might, in his architecture, have secured or prepared for it. As a matter of fact, he aimed at an effect quite different and in its way fully as noble, though not so attractive to the multitude, and is this patent and vital truth to go for nothing? People visit St. Peter's and come back to find St. Paul's cold and bare, but they do not always reflect that the two interiors are treated in essentially different manners. St. Peter's is not finished within in fine stonework, but, in parts, with veneers of costly coloured marbles from antique buildings, and also to a great extent in plaster painted. This is one way of treating a monumental interior, and Wren's is another. The difference in principle between the two is surely one that the intelligent public will be willing to recognise. The subject of "Colour as Applied to Architecture" was discussed at a meeting of the Royal Institute of British Architects in 1857, in connexion with an interesting paper by Professor Aitchison. In that discussion the late Mr. Burges took part, and said, on this very general point, that "the western and southern systems could not go together. If we wanted colouring in a building we must give up the mouldings, or *vice versa*. For his own part," he added, "he would always give up the mouldings." In this case it is not a matter of choice, for the decision was made by the architect two centuries ago, and it is simply flying in the face of principles, that in their own way are as valid as if they were theological, to try now and reverse it. There are other ways of gaining a rich and sumptuous effect in the interior of St. Paul's without hacking away or polychroming Wren's stonework.

The second plausible motive referred to above may seem to have more validity. It is based on the idea that if colour is introduced anywhere in an interior, say, on the roof, it must be carried out on the other parts. At St. Paul's large portions of the roof as well as the great dome were, as we have seen, intended for decoration in colour. This has been applied in the choir in the beautiful and monumental form approved by Wren himself of mosaic. This paper is not written with the intention of criticising adversely the work demanded here, which has been carried out with such conscientious pains by Sir William Richmond. One may feel that the want of previous experience in work of the kind on a similar scale has led to over-elaboration, and that a better effect might have been produced with half the detail, but the effect of the roof of the choir is rich and pleasing, and as the choir with its stalls and its reredos possesses in the lower parts a certain sumptuousness of fittings, the decorative effect was carried out easily through the whole. So soon, however, as the decoration crept out of the choir and fastened on to the upper spaces of the piers of the dome, where, in the open area of the crossing that expands in so monumental a fashion towards transepts and nave, it was seen under quite other conditions, the attempt was at once made to "carry out" the effect of the mosaics by gilding, stencilling, lettering, and what-not on the surface of the stonework. The result of these first essays every one knows, but it may be noted in passing that the obliteration of experiments is apt to spoil the beautiful colour and patina of the stonework, which is the most precious part of the decorative effect of the interior. The one thing that seems to be needful at the present juncture is to recognise that the idea of "carrying out" the roof decoration by gilding and stencilling on the stonework below is artistically impossible, and that in consequence the walls themselves should be allowed to set the key for the whole decoration. It would be quite possible to fill the domes and spandrels with mosaic so quietly treated as to accord with the colour and texture of the walls, which, as has been urged more than once in what has gone before, are in their present condition more beautiful than we can ever hope to make them. Richness of tints is always possible in fittings and in the glass of windows, for some of the Renaissance stained glass in France is nearly as fine as Gothic. The whole difficulty is due to the prepossession that colour is always a welcome adjunct to every kind of architectural interior. We have seen, however, that the more dignified and monumental a building is, the less need it has for any auxiliary of the kind to its stately beauty; and it would be a good thing if architectural theory could be cleared from the notion that colour is an essential element in architectural effect.

A discussion followed, in the course of which Mrs. Traquair and Mr. Scott Morton offered some criticisms on the decoration of St. Paul's as at present carried out.

## *ARCHITECTURAL SOCIETIES.*

GLASGOW INSTITUTE OF ARCHITECTS.—A special general meeting of this Institute was held on the 21st ult., in the rooms, Pitt-street—Mr. Alex. Petrie, vice-president, in the chair. Sympathetic reference was made to the death of Mr. John Burnet, F.R.I.B.A., ex-president, and father of the present president, which took place on the 15th ult. Mr. Burnet had reached the venerable age of eighty-seven years, and was held in the highest esteem by all who knew him. He was one of the original members of this Institute, was long a member of council, and held the office of president from 1876-1878. Latterly he was on the roll of honorary members. He became a Fellow of the Royal Institute of British Architects in 1876. During Mr. Burnet's long career as an architect he and his firm of John Burnet & Son designed many important buildings in Glasgow and the West of Scotland, among others the Western Infirmary, the Stock Exchange, the Merchants' House, the head offices of the Clydesdale Bank and of the Union Bank of Scotland, Woodlands-road United Presbyterian Church, the mansion houses of Auchendennan and Arden, and Rowardennan Lodge, Loch Lomond. Mr. Burnet's relations with the Institute and his professional brethren generally were of the most cordial character, and his genial presence and wise counsel will be greatly missed. It was unanimously agreed that the Secretary be instructed to send an excerpt from this minute to Mr. Burnet's widow. The meeting then took into consideration the unanimous report of the Council regarding the Royal Infirmary competition, and a letter addressed to the chairman and managers of the infirmary, which had been prepared by them, was approved of and adopted. The Secretary was instructed to forward the letter to the chairman and managers, and to send copies to the allied Societies and to the public Press.—*Glasgow Herald.*

## *ENGINEERING SOCIETIES.*

THE INSTITUTION OF JUNIOR ENGINEERS.—A numerously attended meeting of this Institution was held at the Westminster Palace Hotel on Friday, January 25, the chairman, Mr. Percival Marshall, presiding. Before proceeding with the business of the evening, the chairman made a feeling allusion to the great loss which the nation has just sustained, and moved the following resolution, which was passed in silence, all upstanding:—"That the members of the Institution of Junior Engineers are deeply grieved to receive the intimation of the decease of her Gracious Majesty, the universally-beloved Queen Victoria. They humbly desire to tender to his Majesty the King, and to the other members of the Royal Family, their expressions of sincere and respectful sympathy on this sorrowful occasion." The names of thirty-two members, elected since the last meeting, having been announced, Mr. Alexander Ross, M.Inst.C.E., honorary member of the Institution, proceeded to read a paper on "Railway Construction." The author stated that on a new railway being promoted the services of an engineer would be required to make a preliminary survey, to report on the route he would recommend, and to estimate the probable cost; and on these proving satisfactory, his next duty would be to proceed with the surveys, and to take such levels as would enable him to prepare the Parliamentary plans and sections, keeping well in view the requirements of the several Acts of Parliament generally incorporated with the Special Act and particularly the Land Clauses Acts of 1845 and 1863, as well as the Standing Orders of both Houses of Parliament, and the regulations and requirements of the Board of Trade. It was pointed out how very important it is that every attention should be given to the centre line being fixed so as to avoid as far as possible expensive property and buildings, at the same time avoiding such bad curves and gradients as would limit the working capacity of the line. Consideration was then given to curves and super-elevation of the outer rail, and the limiting effect curves had on the load to be hauled, but more particularly on the speed at which trains could be run with safety, the deduction being that for a first-class trunk line of railway no curve should be of less radius than one mile, if this could be reasonably secured. This was followed by a reference to gradients, data being given and a table submitted, indicating to what a serious extent bad gradients limit the hauling capacity of the engine, it being shown that when a gradient is so heavy as to require two engines to do the work of one, it might be economical to expend more capital in securing a better inclination, bearing in mind, however, that circumstances did arise when this did not apply, as, for instance, when coal or iron ore had to be hauled from the higher lands to a dock or depot lower down, the load then being with the gradient and the empty waggons only having to be hauled up the hill. The desirability of balancing the earthwork in cuttings and embankments was referred to, and also that in ranging out the line, level crossings should be avoided, and the number of bridges, viaducts, tunnels, retaining walls, and culverts should be kept down as much as possible and the smallest sizes adopted, consistent with efficiency. Cross sections of cuttings and embankments were illustrated, the author recommending for the cutting a width of 28 ft. at the formation level for two lines of way, earthenware pipes, with cesspits 100 ft. apart, being used at the sides in lieu of side ditches; the ballast carried right across, and in this manner supporting the slopes. Other precautions that should be taken for the prevention of slips in the slopes of cuttings and embankments were noticed. In describing railway bridges the author gave the preference to brick and stone arches when these could be used, both on account of first cost and after maintenance. When the superstructure must be of steel and when headway would admit, he favoured that type where the girders are placed directly under the rails, with parapet girders at a higher level and the whole connected with flooring plates. The paper next dealt with the advantages to be derived by using a type in which two centre girders are employed, and each line of rails is carried by an independent bridge, especially when a railway is overlying coal measures where subsidence is likely to occur, as one line of rails could be lifted while the traffic is conducted over the other line. The construction of tunnels was alluded to, and the several parts forming the permanent way were described in detail, as well as the various processes in use for the preservation of timber sleepers. Special mention was made of steel rails, the author referring to the Report of the Committee appointed by the Board of Trade in May, 1896, and regretting that while recommending the standardising of rails in connexion with (1) weight, (2) section, and (3) the chemical composition, no recommendation was made as to who should undertake this most desirable duty. The concluding part of the paper was devoted to signalling, it being stated that the lock and block system was working its way slowly to the front—and also that at the present time four methods of operating the interlocking, the signals, and the points by power are being considered, viz.: the hydraulic, the electric, the pneumatic, and the electro-pneumatic.' As under existing conditions each of these necessitated the provision of special power, it was thought there was not much to be gained from the point of view of economy, but the author expressed the opinion that the ultimate development of the matter would probably resolve itself into every railway station being provided with a power station, looked after by skilled attendants, not only to supply power to work the signalling appliances, but also for electric lighting, for pumping water, for working hoists, for warming and ventilating the buildings, and to meet the numerous requirements of a railway station.

WILLING'S PRESS GUIDE.—"Willing's Press Guide for 1901" (James Willing, Ltd., 125, Strand, W.C.), is the twenty-eighth annual issue of a concise and well-arranged index to the Press of the United Kingdom. The guide also contains a list of the principal colonial and foreign journals and a variety of general information relating to the Press. It is one of the best and cheapest Press guides published.

## THE GLASGOW INFIRMARY COMPETITION.

THE Glasgow Institute of Architects have addressed the following letter to the Infirmary Committee in regard to the recent competition :—

"115, St. Vincent-street, Glasgow,
January 21, 1901.

*To the Chairman and Managers of the Glasgow Royal Infirmary.*

GENTLEMEN,—Recognising it to be your earnest desire that the Infirmary, when reconstructed, should conform to the most modern standards of design in this class of building, and that the subscribers and the general public have a right to expect this, we, the Glasgow Institute of Architects, as a body of technical experts in such matters, feel it to be our duty to state that, in our opinion, this result will not be achieved if the reconstruction is proceeded with according to the plans selected by your Sub-Committee in the recent competition.

We attribute this failure not to any lack of zeal on the part of your Committee, or of ability on the part of the competing architects, but mainly to the manner in which the competition was initiated and carried through, and that in the following respects among others :—

I. That along with the printed conditions provided for the competition there were issued two sets of sketch plans as indicative of alternative arrangements which the Sub-Committee recommended, and which were stated in the accompanying report to be drawn by, or under the direction of, two members of the Sub-Committee respectively.

II. That a Jubilee Block, to be situated on a particular part of the site, was insisted upon as an integral part of the scheme.

The results of these elements in the conditions were :—

(*a*) That the competitors and the assessor were hampered in the exercise of their individual judgment as to the main points of importance in such a building, viz., the distribution of the various buildings with respect to each other for convenience of working, and of all for the freest access of sun and air.

(*b*) That the competitors were placed in the invidious position that, in the event of the schemes recommended by the Committee not proving themselves to be in accord with their judgment and experience, they were bound, in departing from them, to meet with disfavor from those influential members of the Committee who would enter upon the examination of all the plans with minds necessarily biassed in favour of those which they themselves had put forward, while reserving their position as judges.

(*c*) That as the result the proposal that plan E be accepted, which became the finding of the meeting, was moved by the gentleman who was actually the author of the scheme which was adopted and worked out in detail by this competitor.

III. That neither of the sketch plans issued are in accord with the present day principles of hospital design, as might indeed be expected, seeing that their authors have not enjoyed the training which would qualify them as surgical, medical, or architectural experts; that, in fact, the plans are in many vital particulars inadequate and out-of-date, and that these faults are naturally displayed equally in the selected design, which is but an elaboration of one of them. A corroboration of this assertion with regard to the radical faultiness of the plans in question is furnished by the fact that six out of the ten competing architects found it necessary in spite of risk of possible consequences already alluded to, to entirely throw over the schemes furnished to them, and that among this number are found all the four architects from outside of Glasgow (two from London and two from Edinburgh), who were presumably invited specially on account of their knowledge of hospital design.

Such being the opinion of the Institute after a very mature and careful consideration of the whole subject, we would most earnestly urge the managers, before committing themselves and the public to the erection of any portion of the building, as designed, to have the plans submitted to one or more independent hospital authorities of recognised and outstanding position for consideration and report.

Apart from the all-important question of the erection with the public funds of an entirely adequate and modern hospital, we, the Institute of Architects, feel it necessary to lodge a protest against the setting aside by the Sub-Committee, without any reason given, of the award of the professional assessor, Dr. Rowand Anderson — the more so that a simple majority of one was considered sufficient to overturn his judgment—as liable to prejudice the success, alike for promoters and architects, of future competitions in Glasgow. And we have further to state, that the erection of a Jubilee block, such as is proposed, seven stories high, and in the position selected, will, if proceeded with, dwarf and irretrievably injure for all time the external appearance of the cathedral. The foregoing statements represent the unanimous finding of the Glasgow Institute of Architects, at a meeting specially called to consider a report of the Council on the question, and as the matter is not only one of the greatest public importance, but of extreme urgency, owing to the proposal of your Sub-Committee to proceed at once with the erection of the northern block, it has been communicated to the public Press at the same time as it is submitted, with our earnest prayer for its consideration, to yourselves.

In name and on behalf of the Glasgow Institute of Architects. C. J. MACLEAN, Secretary."

## THE SURVEYORS' INSTITUTION.

A MEETING was held on Monday evening at the Surveyors' Institution, Gt. George-street, Westminster, for the purpose of continuing the discussion upon Mr. R. E. Middleton's paper on "The Future of the London Water Supply."

Mr. J. Shaw, the President, said that since they last met, which was only a fortnight ago, a very great calamity had happened to the country in the death of our beloved Sovereign, Queen Victoria. In consequence of that sad occurrence the council had resolved that it would be most desirable that they should show their respect by adjourning this meeting. It was thought that this course would commend itself also to the members present. In addition to this, the council proposed to send a resolution to the proper quarter, to the effect that the Institution desired to express their sense of the grievous loss sustained by the death of the late Queen, their sympathy with the Royal Family, and their loyalty to King Edward. It was impossible for them yet to realise what the loss really was, but in the midst of their sorrow they could be thankful that the late Queen died so peacefully, surrounded by her family. They should also be thankful for the great example which her late Majesty had left to them in every capacity, whether as wife, mother, or Queen—an example that never could be excelled, even if it could be equalled.

The meeting was then adjourned.

*Students' Preliminary Examination.*

Of the candidates who presented themselves at the Preliminary Examination of the Institution, held concurrently in London, Manchester, Dublin, and Glasgow on January 16 and 17, the following satisfied the examiners :—J. T. Abrahams, Maida Vale; R. S. Andrews, Oxford; O. W. Allen, London; E. R. Appleton, Eaglesciffe, Durham; F. L. Baker, Bishop's Stortford; E. G. Bayly, Berkhampstead; H. C. Beaven, Enfield, N.; R. L. J. Bedford, Acton, W.; R. H. W. Bennett, Wimbledon Park; C. E. Benton, Grimsby; C. J. Berry, Wandsworth-common; B. F. Blois, Bournemouth; L. V. Bowler, Southend; T. H. Bowler, Canterbury; H. Brown, Chichester; W. E. Brown, Chester; A. H. Bulteel, St. Austell; H. Burch, Highgate; E. C. Burgess, West Hampstead; R. H. Burstow, Hailsham; C. R. Campbell, South Kensington†; W. J. Carlisle, Gloucester; J. G. Chapple, Acton, W.; A. Chard, Thorverton; A. H. Clarke, Walthamstow; W. C. Clemens, Plymouth*; C. S. Cobb, Strathfieldsaye; H. Cooper, Gravesend; H. J. Culpin, Walthamstow; H. Darby, Bridlington; W. G. Davies, Newbridge; A. C. Dorrington, Lancaster; W. M. Dugdale, Oswestry; S. Edwards, Exeter; C. Eggar, Farnham; F. C. G. Ellen, Andover; R. A. Ellis, Wanstead; C. S. E. Evans, Haverfordwest; G. W. Ferris, Maida Vale; J. A. Flatt, Wanstead; J. H. Fenning, Bedford; G. F. Finch, Hornsey Rise; A. K. Foulis, Motherwell; E. L. Frost, Anerley; H. J. Gale, Wheatley; T. M. Glasson, Aspatria; T. K. Gloag, London; P. W. Gregory, Haverstock Hill; O. Greenwood, Todmorden; J. C. Grierson, Liverpool; E. M. Haes, Surbiton; V. M. Hall, Hampstead; E. C. Harris, Upper Tooting; E. T. Haslehust, London; E. R. Hawkins, Downham Market; J. Hayward, Bath; G. S. Henderson, Kilmarnock; H. A. Hinton, Highgate; S. Hooper, Upton Manor; R. L. Honey, Rochester; J. N. Horsfield, jun., Kingston-on-Thames; E. Howard, Snaresbrook; E. E. V. Ives, North Walsham; E. C. Jarvis, Upper Tooting; S. B. King, Abingdon; W. H. Lamble, London; J. C. Lucas, Lewes; A. J. Lyddon, Plymouth; M. L. Lyon, London; J. E. G. McSheehy, Wimbledon; J. Matley, Oldham; E. Meacher, Salisbury; C. McC. Myott, Cambridge; J. S. Naylor, Beckenham; A. O. Noakes, Willesden Green; O. T. Nettleton, Kensington; H. B. Owen, Newcastle, Staffs.; J. O. Payne, Bromley; C. F. Peile, North Finchley; G. L. Pepler, Croydon; A. P. Pickersgill, Putney Hill, S.W.; E. T. F. Pope, Margate; P. H. Ross, Holloway; T. Rule, Aspatria; A. Salwey, Broxbourne; W. S. V. Sansom, Colchester; T. E. Scammell, Redland, Bristol; J. J. Shardlow, Leicester; A. J. Shield, Liverpool; F. M. Skelt, Leytonstone; S. W. Smith, Cheshunt; W. B. Smith, Hinckley; C. T. Steward, London; N. D. Stewart, Dunston, Salisbury; T. Tivendale, Stoke Newington, N.; C. W. Unsworth, Altrincham; A. A. Vigers, Walton-on-Thames; P. D. Voisey, Exeter; I. Wall, Huddersfield; S. J. Walter, New Wanstead, E.; A. H. Wells, Ashby-de-la-Zouch; A. V. White, Portsmouth; H. W. Whitton, Caswell, near Towcester; W. O. Wightman, South Croydon; H. W. Wilkinson, Winchmore Hill; H. Williams, Croydon; H. Wood, Grimsby; E. E. Woodbrige, Harrow-on-the-Hill; J. P. Woodhams, Hastings; B. Worrall, Whalley Range, Manchester; H. O. Young, Rock Ferry, Cheshire.

* Bracketed equal for head of List.

## THE LONDON COUNTY COUNCIL.

A SPECIAL meeting of this Council was held on Tuesday afternoon in the County Hall, Spring Gardens, Alderman Dickinson, Chairman, presiding, when it was agreed that an address of condolence in the affliction of the King, and of congratulation upon his accession to the throne, be presented to his Majesty the King.

The ordinary weekly meeting was then held.

*Loans.*—The Finance Committee recommended, and it was agreed, to lend Battersea Borough Council 4,795*l.* for building a coroner's court and mortuary; the Shoreditch Borough Council 2,430*l.* for a street improvement; the Woolwich Borough Council 6,550*l.* for stables and underground conveniences; and the St. Pancras Guardians 2,600*l.* for works at the infirmary.

*New Statistical Officer.*—On the recommendation of the General Purposes Committee, Mr. E. J. Harper, assistant valuer, was appointed statistical officer, in place of Mr. Gomme, promoted to be Clerk of the Council, in succession to Mr. Stewart.

*Spitalfields Market.*—In view of the Bill which the Council is promoting for the acquisition of Spitalfields Market, a provisional agreement with the freeholders, putting the price at 176,750*l.*, was approved.

*The Port of London.*—The Rivers Committee, in the course of a long report, recommended the Council to pass the following resolutions :—

"That the Council authorises the Rivers Committee to arrange for evidence to be given before the Royal Commission on the following lines :—

That the management of the Port of London and the docks of the London and India, the Millwall and Surrey Commercial Docks Companies should be consolidated in the hands of one public authority.

That the port should for all purposes be defined as extending from the tidal limit of the Thames at Teddington on the west to an imaginary line drawn from the Naze to the North Foreland, subject only to provisions similar to those in the Thames Conservancy Act, 1894 (Section 3 and the second schedule) with regard to charging shipping dues.

That the management and administration of the port and docks should be in the hands of a Statutory Authority, to be called the 'Port of London Committee,' subject to the Council retaining the control of capital expenditure.

That power should be conferred on the Council to purchase the property of the dock companies, and to raise the capital necessary for that purpose for the deepening of the channel of the river, and the improvement of the port and docks.

That the Port of London Committee should be constituted on the general principle of one-third representation of the Council, one-third of shipowners and merchants, and one-third of the City and official members.

That in view of the national interest in the Port of London the Government be invited to contribute towards the expense of improving the port.

That repayment of capital should be provided for by instalments spread over 100 years, on the annuity system."

These recommendations were agreed to, after discussion, practically unanimously.

*Euston-road Fire Station.*—The Fire Brigade Committee recommended, and it was agreed, that the estimate of 15,200*l.* to be submitted by the Finance Committee in respect of the erection of the proposed Euston-road station be approved, and that tenders be invited by public advertisement for the work.

*Housing : Caledonian Asylum Site, Holloway.*—The Housing of the Working Classes Committee recommended, and it was agreed, that the estimate of 16,500*l.* submitted by the Finance Committee be approved, and that the Council do acquire, under Part III. of the Housing of the Working Classes Act, 1890, the Caledonian Asylum and the site thereof, subject to the sanction of the Charity Commissioners, and subject to a provisional agreement embodying the conditions set out in the Committee's report.

*Tower Bridge Southern Approach.*—On the recommendation of the Improvements Committee, it was agreed—

(*a*) That the working-drawings, specification, and estimate of the cost (21,500*l.*) of the paving and other works in connexion with the portion of the

new Tower Bridge southern approach between Purbrook-street and Artillery-street be referred to the Manager of the Works Department, with a view to the work being carried out without the intervention of a contractor.

(*b*) That the Improvements Committee be authorised to engage, at the weekly wages of 3*l.* 13*s.* 6*d.*, a clerk of works in connexion with the portion of the new Tower Bridge southern approach between Purbrook-street and Artillery-street.

*Westminster Improvement.*—The Improvements Committee recommended, and it was agreed—

That the estimate of 1,315,000*l.* (in substitution for the capital vote of 51,443*l.* which was approved by the Council on November 6, 1900), submitted by the Finance Committee in respect of the Thames Embankment extension and Westminster improvements at Millbank be approved, and that, as the Council of the City of Westminster had undertaken to make the necessary contribution of 100,000*l.*, the Improvements Committee be authorised to incur expenditure on capital account up to 1,315,000*l.* for the purpose of the improvements in question.

*Theatres, &c.*—The Theatres and Music-halls Committee recommended that the following applications be agreed to :—

Alterations to gallery, Euston Theatre of Varieties (Messrs. Wylson & Long).

Gallery steppings at the Grand Theatre, Islington (Mr. F. Matcham).

Quadrant Restaurant, London Exhibitions (Mr. A. O. Collard).

Deviations from plans of St. Pancras Public Baths (Mr. T. W. Aldwinckle).

The recommendations were agreed to, and the Council, having transacted other business, adjourned.

## THE LONDON BUILDING ACT, 1894:

### THE L.C.C. AND BUILDING LINES.

#### TRIBUNAL OF APPEAL CASE.

A SITTING of the Tribunal of Appeal under the London Building Act, 1894, was held on Friday last week at the Surveyors' Institution, Great George-street, Westminster, to hear the appeal made by Mr. James Ellis against the certificate of the Superintending Architect of the London County Council defining the general line of buildings on the south side of Woolwich-road, Greenwich, between the house known as No. 480 in that road and the street known as Ransom-road. The certificate referred to was issued under Sections 22 and 29 of the London Building Act, and the plan to which it referred—the one approved by the Superintending Architect—showed the building line to cut through a projecting house owned by Mr. Ellis. It was against this that Mr. Ellis appealed. The members of the Tribunal present were Mr. Arthur Cates (Chairman), Mr. Penfold, and Mr. Hudson. Mr. Ellis conducted his own case, and Mr. Dalbie, barrister (instructed by Mr. Andrew), represented the County Council.

At the outset of the hearing a question arose as to whether the Superintending Architect against whose certificate the appeal was made should be in attendance. Mr. Ellis maintained that as that gentleman was in the position of defendant, his attendance was necessary. In the certificate which he had issued he made certain statements which he ought to be there to substantiate, and he (Mr. Ellis) in turn was there to defend himself against the Superintending Architect.

After consultation, Mr. Hudson said the Tribunal had asked him to express their view of the position held by the Superintending Architect with regard to the present application. Their opinion was that that official was an independent officer. Before certain persons could do anything under the Building Act it was necessary that they should first of all obtain his certificate. If any dispute arose as the result of the provisions of the certificate, any of the parties concerned could, if they pleased, subpœna the Superintending Architect as a witness to be cross-examined by both sides, but they must take the risk of doing so.

The Chairman expressed the further opinion that the Tribunal was limited under Section 183 of the Act to require the production of documents or books, and to hear and receive evidence.

Mr. Dalbie pointed out that there was nothing in the Act, so far as he was aware, about the power of the Tribunal to call witnesses. Mr. Ellis asked if the more dignified course for the County Council to follow would not be to ask the attendance of their Superintending Architect. He was there in the interests of fairness, and he did not think his request an unreasonable one.

The Chairman: The case, then, must be left in this position, that you may request the attendance of the Superintending Architect.

Mr. Ellis: I do request it, but, unfortunately, he is not here. He has made an accusation and made a certain statement, and he is bound to be here to defend that statement.

The Chairman: The practice has been for the Superintending Architect not to be here.

Mr. Ellis: Perhaps not, in many cases, but in this case I wish to put him in the box as my witness. I am going to prove that he has attached to the plan a line that was not settled on the day when he met the parties, and that he altered his plan after he left the parties. I am also going to show that once a decision has been arrived at by a public body it cannot be altered.

The Chairman: You have not given the Superintending Architect any notice asking him to be present.

Mr. Ellis: I have written the Solicitor of the County Council stating that the plan attached to the certificate is a false one. I have not made a formal request for him to be in attendance.

The Chairman: It is to him you must communicate your desire that he should attend. If he, in response to that, declines to attend, it is for you to consider what steps you shall take to enforce his attendance.

Mr. Ellis: Unless he attends to-day the invalidity of his plan and certificate shall be established. It was for the counsel of the County Council honourably to call for the attendance of the Superintending Architect.

Mr. Hudson: They decline to do so, and leave you to prove your case.

Mr. Ellis: There being no defendant present, I have obviously no one to fight.

Mr. Hudson: Then that is to your advantage, but you must prove your case.

Mr. Ellis: Then I am prepared to proceed.

The case was then proceeded with, Mr. Ellis opening his appeal by handing in a copy of the correspondence that had passed between him and the Solicitors of the County Council, adding that copies had been sent to the Solicitor of the Council and also to members of the Tribunal. His objection to the plan annexed to the certificate was, he added, that the line of building therein marked by the Superintending Architect was not the one marked by him in the presence of the parties who attended the meeting held in December.

At this point the plan referred to was produced, and Mr. Ellis, after inspecting it, agreed that it was the one submitted to the parties with a certain pencilled line made by the Superintending Architect deleted. The line which there appeared was not the one made by the Superintending Architect in the presence of the parties concerned. He had on two occasions subsequent to the meeting pointed out to that official the absurdity of making a building line which cut directly through a house that was more than a hundred years old. It was impossible, of course, for him to say whether the particular piece of linen submitted to the Tribunal was the one which was marked by the Superintending Architect in the presence of the parties.

Mr. Andrew (the Council's Solicitor) stated that an assistant in the County Council's office who was present at the meeting was in attendance, and he would prove the plan to be the identical one submitted on that occasion.

Mr. Ellis submitted that the plan, having been approved by the Council, could not be altered, and in proof of this contention quoted the case Slee *v.* the Mayor of Bradford (8 *Law Times* (New Series), p. 491). In this case, he said, it was held that when a Town Council had approved a plan they had no right afterwards to alter the line of frontage.

The Chairman remarked that this was very good law, but he could not see that the approval by the Superintending Architect should be held as equivalent to approval by the County Council.

Mr. Ellis: Surely he is the representative of the County Council, and the Council is responsible for him?

The Chairman: No, he is not. He does not arrive at his certificate until he makes inquiries and decides as to what form his certificate will take. It is the final certificate, and that alone, we have to deal with. What transpired previously is quite beyond us.

Mr. Ellis: Passing over that, then, I have to submit that my application of October 4 was not made under Section 22. It was an intimation to the County Council that for the sake of peace I was willing to give up land, 48 ft. in length and 9 ft. in breadth, to widen the Woolwich-road, which is extremely narrow and dangerous at that point. I gave up that land voluntarily and without prejudice, and, as you will observe from the correspondence, I reserved my right to disregard the Council's pleasure or refusal. I wished to meet the Council for once by making the offer I did. The Council did not accept, neither did they refuse it. Three weeks passed, and then I was asked to send in a fresh plan, as nothing had been done with my application—if application it can be called—and I did so. Subsequently the remark was made that the architect might be asked to define the line of building in Woolwich-road, and then I stated that this would not affect my line of building.

The Chairman asked if there was any plan lodged on October 4, as there was nothing referring to it in Mr. Ellis's letter to the Council of that date.

Mr. Ellis replied that there was.

Mr. Dalbie remarked that Mr. Ellis was entitled to assume that consent was given to his proposal. Under Section 27 there was the express provision that "the consent given by the Council shall not affect the building line." Assuming that he had the consent, I cannot see that it would help him, having regard to Section 27.

Mr. Ellis: You are misconstruing that Section. If the Council gave consent to No. 498 to bring out his house, No. 496, next door, could not assume that he also had a right to do so. The reading of the Section is this, that providing the County Council do give consent for a particular person to bring out his property, it shall not bind them to assent to the people next door doing the same. Madame Tussaud's, in Marylebone-road, is a case in point. Continuing, Mr. Ellis said that his next points were that his application of November 15 was made at the request of the Council's Solicitor and Superintending Architect, and in no way barred his first application of October 4, and that his offer to give up a strip of land 9 ft. broad was gratuitous, he being only bound by Section 13 of the Act to keep 20 ft. distant from the centre of the road. He further maintained that as Ransom-road, which runs through Woolwich-road, broke the building line, as was proved by its absence from the plans of the Superintending Architect, owners of property beyond were not entitled to be heard in this case. His next point was that the Local Authority of the district had no *locus standi* as his building was not within the prescribed distance from the centre of the road, and that the works consisted of extensions only and consisted of one and the same building. The material point in this case was that Section 22 of the Act did not apply to his application, for that section only applied to where a building was erected within the prescribed distance, for if it was the County Council could take action.

Mr. Hudson remarked that his understanding was that the appeal was made under Section 25 of the Act, and it seemed to him as if Mr. Ellis was wandering about all sorts of sections. The appeal was against a certificate of the Superintending Architect defining the general line of buildings. He understood Mr. Ellis to have made a proposition without regard to Section 22, that the Council declined it, and that, as a consequence, it was abortive.

Mr. Ellis replied that his offer to the Council came to an end. The Superintending Architect, in fixing the building line, ran his head against a wall that was more than a hundred years old. Having failed to make a hole in it he attempted to cut through it, as was marked in the plan. Now, the Act contained provision respecting the prolongation of a building line, but whoever heard of the prolongation of a line being severed by 20 ft.?

Mr. Hudson pointed out that in his application of October 4, Mr. Ellis applied for leave to erect two domestic dwellings to be used as shops and dwellings. He asked the appellant to consider how these could be described as one building.

Mr. Ellis replied that he was putting iron doors to join the buildings. He said it was outside the power of the London County Council to restrain any one from building if he was 20 ft. from the centre of the road if there was no line at the point, and it was an extension of an existing building as was the case in his instance.

Mr. Ellis afterwards entered the witness-box and gave evidence, as did Mr. Harry Saywood, the appellant's foreman; Mr. Walter Spier, the District Surveyor; and Mr. W. T. Perkins, an assistant in the office of the Superintending Architect of the London County Council.

Mr. Dalbie, for the County Council, contended that they might have a general line of building even with one or even two buildings projecting over it, and this was the position of the building at 494, Woolwich-road. He submitted that this property should not be left out in the way suggested. If it were, it should not form a precedent for bringing out the two adjoining houses. As the matter stood at present the only obstacle to getting a proper building line for that part of Woolwich-road was No. 494, and if Mr. Ellis pulled that property down with the intention of rebuilding it, the Local Authority would have the opportunity of having it set back to the general building line by paying compensation.

Mr. Ellis repeated his contention that so long as he was kept out with the prescribed distance from the centre of the road he required no consent from the County Council or any one else to build. They had no power whatever to interfere with the property at 494, Woolwich-road, and he could carry it along to the point where he had offered to concede land to the County Council of the value of a thousand pounds. His offer stood open to the Council to accept because he had full sympathy with the community, and desired to see the road at that point widened.

The Chairman remarked that the Superintending Architect could not have intended to conceal anything, as he went to the spot and used his own judgment. Any attempt such as Mr. Ellis suggested would, therefore, have been vain and futile, and he could not put the intelligence of the Superintending Architect at such a low standard as to imagine that by putttng forward any plan he could hope to deceive the Tribunal.

Mr. Ellis: I hold that I have a substantial grievance in the refusal of the Council to produce the Superintending Architect to-day.

The Chairman: You should have taken steps to ensure his attendance.

After some further observations the chairman intimated that the Tribunal would consider all the points raised, and issue their decision in due course.

# Illustrations.

## GLASGOW ROYAL INFIRMARY RECONSTRUCTION.

WE give this week full illustrations of the design for rebuilding the Glasgow Royal Infirmary, by Mr. H. E. Clifford, of Glasgow, to which the assessor, Dr. Rowand Anderson, awarded the first premium, and which, it would appear, ought to be the one to be carried out, though the committee, apparently, have chosen to throw it over.

The following extracts from the architect's descriptive memorandum, sent in with the design, will serve to explain the drawings :—

"*Block Plan.*—In arranging the position of the various blocks on the site, scheme No. 5 has in a large measure been adhered to. It provides the greatest possible amount of free space between the infirmary buildings and the high tenements on the west side of Castle-street, while to the east of the infirmary buildings there is ample free space. The open front quadrangle gives convenient access to each block.

It is proposed to erect the north part of block A (which stands clear of the present buildings), before taking down any of the present buildings. This is suggested with a view to maintaining the existing accommodation as far as possible throughout the entire reconstruction. The Pathological Institute remains in its present position, and will require at some future time to be rebuilt. Any attempt to alter the existing building is felt would be a mistake. The present laundry block, being considered sufficient, is not interfered with. Additional boilers are erected at the west end of laundry block to provide steam for the hot water supply to the infirmary buildings, and for warming fresh air in ducts to wards, &c. The chapel is placed at end of conservatory corridor, near west end of nurses' home. The nurses' home can be added to at east end.

*Superintendent's House.*—The house would be erected on ground at east end of site.

*Basement Floor.*—Owing to the levels of the site, this floor extends only under blocks A and C. Besides access by stairs from ground floor, there is an entrance from Vicar's-alley for stores, &c. A corridor is arranged from basement of block A to present mortuary and new boiler house. The accommodation on this floor is :—

1. General stores, with lift direct to kitchen on top floor.
2. Linen and sewing-room.
3. Mattress and mattress-work-room.
4. Dorcas, dressmaking, and patients' clothes.
5. Turkish bath.
6. Electrical department.
7. Gymnasium.

Surgical service.

One ward (spare), fifteen beds at 1,500 cubic feet per bed.

One side ward (spare), four beds at 1,760 cubic feet per bed.

One side room (spare), one bed at 1,838 cubic feet per bed.

*Ground Floor.*—Although an entrance is shown at front of Cathedral-square block, the working entrance to the infirmary is from Castle-street. A gatehouse with emergency wards is placed at west end of block B, and adjoining working entrance. The porter is also here. Accommodation on this floor is:—

*Block A.*—One complete surgical service.

Three wards, forty-three beds at 1,560 cubic feet per bed.

One side ward (female), four beds at 1,760 cubic feet per bed.

Two side rooms, two beds at 1,790 cubic feet per bed.

*Block C.*—Administrative.

*Block B.*—Administrative and emergency wards at Gatehouse.

Two wards, eleven beds at 2,001 cubic feet per bed.

*Block D.*—Isolation.

Five wards, twenty-seven beds at 1,550 cubic feet per bed."

The other stories follow much the same general arrangement, so that we need not continue the schedule further, except in regard to—

*Sixth Floor (over Block C only).*—Contains kitchen, &c., and storage accommodation supplied from general stores in basement. The kitchen is in centre of Block C, and a service passage is arranged on same level in roof over Blocks A and B, giving a direct service for food by trolleys to the hoists of Blocks A and B.

*Abstract of Accommodation.*

| | Male. | Female. | Spare. | | Total. | |
|---|---|---|---|---|---|---|
| Block A | 179 | 120 | 20 | = 319 | } | 432 Surgical. |
| „ C | 43 | 59 | 11 | = 113 | } | |
| „ B | 137 | 109 | — | = | | 246 Medical. |
| „ D | 16 | 11 | — | = | | 27 Isolation. |
| | 375 | 299 | 31 | | | 705 |

*Style of Architecture.*—The English Renaissance has been considered the most suitable style from every point of view, and in order to emphasise the Diamond Jubilee, royal crowns have been introduced on the Cathedral-square façade, and the equestrian statues flanking the entrance could be those of the Queen and Prince Consort.

*Materials and Construction.* — The foundation would be concrete, and the outside walls of freestone. The stone for external face to be from Locharbriggs Quarry, Dumfries, all angle tooled.

The principal division walls would be brick, and the remainder of fireproof 'Fram' construction. The roofs would be slated with large-size pale green slates. The central dome and sanitary turrets covered with copper.

The floors would be fireproof, composed of steel girders, steel beams, and 'Fram' arch-blocks, finished on ceilings with 'Fram' boards coated with Adamantine polished plaster. The floors of wards, sanitary turrets, corridors, operating theatres, kitchen department, and all basement would be laid with 'Terrazzo' (see Paisley Infirmary and many Continental hospitals), and the floors of other apartments would be laid with pitch pine flooring, nailed direct on to 'Fram' blocks.

The interior of stone walls would have metal straps and expanded metal lathing, finished with Adamantine polished plaster.

The lower part of wards and corridors, and all the kitchen walls to be Covered with crystalline tiles of large size (the joints of these tiles are so close no lodgement is afforded for dust), and the operating theatres to have walls and ceilings entirely covered with these tiles, so that they may be thoroughly steamed.

All floors, walls, and ceilings to have corners rounded.

*Heating and Ventilation.*—It is proposed to adopt the 'Plenum' system as perfected by Mr. William Key, and so successfully carried out by him in Paisley Infirmary. It is impossible to give an adequate representation of his methods on plans, but his system is now so perfect that, with telephonic communication from every part of the building to the engineer, the temperature and volume can be regulated to a nicety at any point. The air of the wards is changed ten times an hour during winter, and up to fourteen times an hour during warm weather. Steam boilers for air warming are placed at end of laundry block.

*Hot Water Supply.*—The arrangements for this supply throughout the blocks are :—The utilising of steam from boilers of heating apparatus, supplying steam by pipes carried along in a duct outside of the buildings, and into copper water-heaters and hot water stock tank combined, placed in basement of each sanitary turret, from which an instant hot water supply is available at any point on the various floors.

The probable cost is estimated at 238,000*l*."

## INTERIOR VIEW OF ST. PETER'S.

THIS view of the interior of St. Peter's is placed among our illustrations this week in connexion with Professor Aitchison's Royal Academy lecture. We have other illustrations to give with the succeeding lectures.

## PROPOSED NEW WATER REGULATIONS.

THE following remarks on the subject of water-closet flushing cisterns, included by Dr. Orme Dudfield, the Medical Officer of Health to the Borough of Kensington, in his last four-weekly Report, may be read with advantage at present. The italics in one or two passages are our own :—

"Information on the subject, and some useful criticisms, will be found in a report by the Electric, Gas, and Water Committee of the Borough Council of Paddington, lately communicated to the other Metropolitan Borough Councils. One or two points not emphasised in that document seem to call for notice. And firstly, it would appear, by implication at any rate, that regulations 32 and 34 might have the effect of preventing, in future, the construction of pan and valve closets, as it is proposed that every water-closet shall be supplied through a flushing cistern or service box so constructed so as to 'prevent the discharge of more than two gallons of water at each flush, or a continuous flow of water,' *i.e.*, by raising the lever or handle attached to pan and valve closets, which cannot be properly cleansed through a flushing cistern or service box. The object aimed at is economy in the use of water—a commendable object, if compatible with efficiency for cleansing the basin and trap of the closet. *The proposed quantity of water—not more than two gallons at each flush, the quantity discharged often not exceeding one-and-half gallons—is inadequate for the purpose.* Flushing cisterns are usually fed through a pipe of small dimensions and do not refill fast enough to enable the user of the closet to remain long enough to apply a second flush. Were it the custom to feed the flushing cistern with a large bore pipe, the question of capacity of the said cistern would be of less moment; for then the person using the closet might follow the practice which, at the inquiry by the Local Government Board in 1895, the learned counsel for the Water Companies said he adopted, when necessary, viz., *to use a second flush—thereby giving the case away;* the obvious purpose of the regulation, limiting the quantity of water to two gallons at each flush, being to prevent the discharge of more than that amount at each use of the closet. The late vestry strongly advocated the adoption of the three-gallon cistern, and a very great many such cisterns have been fixed in this borough, the companies having raised no objection. The County Council, partly at the instance of the vestry, brought about the afore-mentioned inquiry, which resulted in the inspector appointed to hold the inquiry, deciding in favour of the continuance of the limitation to a two-gallon flush. Under the instructions of the vestry, the Council's surveyor and myself had a conference with the directors of the Chelsea Water Company in 1896, the Company's officers having in that year exhibited much activity in preventing the use of three-gallon tanks in their district. It was frankly admitted that the Company did not object to the use of such tanks on the score of local deficiency of supply, but only as an act of loyalty to the companies (acting with solidarity through a committee of the chairmen), and on account of the difficulties experienced at the time in connexion with the supply of large areas, especially in the eastern parts of London. The directors appeared to be surprised when told that a literal enforcement of the existing regulation, and the supply of closets through flushing cisterns only, would entail the abolition of valve closets, a statement confirmed by their own engineer present on the occasion."

## *COMPETITIONS.*

SWANSEA HARBOUR OFFICES. — On the 24th ult. the report of the adjudicator on the Swansea Harbour Offices plan competition was submitted to the executive of the Swansea Harbour Trust. There were ninety-seven sets of plans sent in, and those of Mr. E. Seward, Cardiff, were adjudged to be the best, and he obtained the first premium of 100*l*. Messrs. Fairhurst & Thornley, Blackburn, secured the second premium of 50*l*. The adjudicator was Mr. W. M. Fawcett, of Cambridge.

NEW INFIRMARY, BRISTOL.—The competition for a new infirmary to accommodate 1,000 beds has now been settled. The committee of the Guardians dealing with the matter have considered the award of the assessor, and find that the three designs considered by him to be entitled to rank as the best and to be awarded the premiums are—1. Mr. H. Percy Adams, F.R.I.B.A., 28, Woburn-place, Russell-square, London ; 2. Messrs. Giles, Gough, & Trollope, of 28, Craven-street, Charing Cross ; 3. Mr. Arthur Marshall, A.R.I.B.A., of Nottingham.

## EARTHWORKS AND CASTLES OF EARLY ENGLAND.

THIS was the title of an illustrated lecture given by Mr. Elliot Malden at the London Institution on Monday. In his opening remarks the lecturer said there were many different ways in which history had been approached in these later ages, but none had been more conspicuously successful than in the study of past times through their material remains. Such remains had a special advantage over written work, for, as the late Professor Freeman pointed out, the writers of original documents not only might sometimes be mistaken, but might sometimes be liars. Material remains, at all events, were genuine, though they might not always be read correctly by us. Among the remains which past ages had left in England, fortifications, fortified houses, military posts and camps of refuge, were very numerous and sometimes very remarkable. It was remarkable, too, that they had been so much overlooked or only casually studied. Ecclesiastical architecture was much more generally known to the man in the street than was military architecture. Most people could tell whether a church was Norman, Decorated, or Perpendicular, though they might not be able to go into detail ; but an ordinary person had not the slightest notion whether the Tower of London or Arundel Castle or the Round Tower of Windsor was likely to be the older, and had not the slightest notion why the Round

Tower was round or the Tower of London square. There were two great uses for the military works of the past; they were either erected to shelter a considerable number of people and their flocks and herds, or they were erected for purely military reasons, for the command of the country. Posts on the top of a hill commanded distant views, but that did not give the command of the country, which could only be obtained by means of a garrison. The country could only be commanded by occupying the passes, fords, and bridges, and at such places camps were constructed. For sheltering non-combatants the top of a hill was a suitable place, and the primitive fortifications of our ancestors were on the tops of hills, by fords, passes, and rivers. The Roman camp was rectangular in form, while that of the ancient Briton was irregular in shape, following the contour of the ground on which it happened to lie. Ancient British camps were surrounded sometimes by two, sometimes by three, banks and ditches, and in rare cases by four; the Roman camps by one wall and ditch. The British camps were larger than the Roman, as they were meant to include a large number of people and cattle, and a British camp near Dorking covered an area of eleven acres. The camps were not permanent habitations, and no doubt the people had permanent villages near; nor were they constructed to stand long siege, as nine out of ten had no water in them. The ancient British shelter camp, if untouched by subsequent occupants, was now a simple grass-covered hill, with banks and ditches covered by brushwood, but the Roman stations had in many cases been turned into permanent fortresses with walls round them. It was marvellous what the ancient Britons did with their primitive implements! The remains of many different periods were found in these camps, and as flint implements and primitive stone implements, were found in considerable quantities, it was safe to conclude that primitive people occupied the camps for a considerable time and in considerable numbers. Old Sarum, Salisbury, was a striking instance of a primitive fortification held through subsequent ages until the time when the site of the city of Salisbury was transferred to where it now stands. After the Romans left, it was clear that the native inhabitants, having learnt something from the Roman engineers, were in the habit of making their camps rectangular in form, while keeping their primitive form of embankments to some extent. With the West Saxons came the building of burhs, places of shelter for a small community, which were common to Scandinavian and Low German nations. The burh consisted of a mound surrounded by an earth wall protected by wooden palisading, and with a house in the middle. Castles of masonry were much later erections. Prior to the time of William the Conqueror similar castles were erected in a few days or weeks, while, of course, castles of stone would have taken much longer to erect. But with the Normans came elaborate fortifications of stone, built more or less on primitive lines, the Normans enclosing the old British mound with a circular wall. There were several examples of this period, among them being Arundel Castle, Sussex, where a castle, in one form or another, existed from the time of King Alfred; Cardiff, Lewes, Porchester, and Rochester. With all their apparent skill in building, the Normans were not always skilful architects, and they built massively because they did not build well. The best known example of a Norman keep was at the Tower of London, though there was a great deal more than the keep, which had been badly dealt with by restorers. Inigo Jones put some big windows in it, for instance, which certainly did not belong to the original structure. Guildford Castle was a curious example of a Norman square tower erected on an artificial mound, and it was one of three such examples he knew of. The lecturer then referred to concentric fortifications—walls flanked by circular or semi-circular towers. While the Norman keep was a difficult place to capture, it was difficult to escape from it, and a very few soldiers could prevent the escape of the occupants; but a large force was required to blockade a concentric castle, and such a force always ran the risk of starving itself as well as the people blockaded. Concentric castles were, therefore, strong against active attack and strong against blockade. Residential castles were a very different type, and were erected when fortified places were not much in demand and when it was considered fashionable to live in castles. One interesting point about castles was the way in which they were turned to account by different occupants at different periods. At Bramber Castle, Sussex, there were within the same area remains of the ancient British mound; there was enough to show that the Romans occupied the place; there was the Early English mound with its fortifications of earth and wooden palisading, and then there was the Norman stone keep. The Tower of London was also used for varying purposes at different times.

## APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

AT the meeting of the London County Council on Tuesday the following applications were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated:—

*Lambeth North.*—That the Council do make an order as follows—Whereas Mr. E. Andrews, of the Engineer's office, Waterloo Station, London, on August 21, 1900, under the provisions of Sections 13, 41, and 42 of the London Building Act, 1894, delivered on behalf of the London and South-Western Railway Company, at the County Hall, plans of four blocks of intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on a site between Boniface-street, and Lambeth Upper Marsh, Lambeth, and of a block of intended dwelling-houses, to be inhabited by persons of the working-class, proposed to be erected on the north side of Lambeth Upper Marsh, with an irregular open space at the rear, and the boundary fences of the site at less than the prescribed distance from the centres of Lambeth Upper Marsh and Boniface-street. . . . and whereas Mr. E. Andrews has since submitted an amended block plan (signed by the Chairman of the Building Act Committee) showing the boundary fence in Boniface-street set back the prescribed distance from the centre of that street . . . the Council does by this order sanction the said plans. . . .—Agreed.

*Lines of Frontage.*

*Brixton.*—Dwelling-houses on the eastern side of Coldharbour-lane, Brixton, at the corner of Vaughan-road, and the erection of houses on the eastern side of Vaughan-road (Messrs. Shoebridge & Rising for Mr. J. Pearman).—Consent.

*St. George, Hanover-square.*—A shop front, with projecting cornice and stall-curb, to premises on the south side of Oxford-street at the north-east corner of New Bond-street (Mr. W. J. Almond for Mr. S. L. Stacey).—Consent.

*Marylebone, West.*—A wood, glass, and brick corridor in front of No. 33, Hamilton-terrace, St. John's-wood (Mr. T. B. Baldwin for Mrs. E. Wilkinson).—Refused.

*Line of Frontage and Width of Way.*

*Lambeth, North.*—An office building with projecting bay-windows at No. 45, Belvedere-road, Lambeth (Mr. R. G. Booth for Mr. C. Braby).—Consent.

*Line of Frontage and Construction.*

*Hammersmith.*—That Mr. T. Athey be informed that the Council is not prepared to accede to his request, on behalf of Mr. G. Tobutt, for permission to retain a wood and canvas fruit stall on the forecourt of No. 46, Uxbridge-road, Shepherd's Bush.—Agreed.

*Width of Way and Construction.*

*Hampstead.*—That Messrs. J. Sloper & Co. be informed that the Council is not prepared to accede to their request for permission to retain three wood and iron sheds adjoining the Tower Royal Works, Blackburne-road, Hampstead.—Agreed.

*Mile End.*—A temporary brick and iron church at the rear of No. 381, Mile End-road, Mile End, at less than the prescribed distance from the centre of Lawton-road (Mr. F. A. Walters for the Rev. W. Donlevy).—Refused.

*Width of Way and Construction of Gangway.*

*Hammersmith.*—An iron gangway, across the footpath known as Upper Mall, Chiswick, and with the fence in front of the northern buttress of the gangway at less than the prescribed distance from the centre of the footpath (Mr. M. W. Hervey for the West Middlesex Water Company).—Consent.

*Formation of Streets.*

*Whitechapel and Bethnal-green, South-West.*—That an order be issued to Messrs. W. Bradford & Sons, sanctioning, under the provisions of Section 10 of the London Building Act, 1894, the widening of Brady-street, Bath-street, and Foster-street, Bethnal-green, and the widening and adaptation for carriage traffic of Thomas-passage (for Messrs. Mann, Crossman & Paulin).—Consent.

*Woolwich.*—That an order be issued to Mr. W. Egerton, refusing to sanction the formation or laying out of a new street for carriage traffic out of Swingate-lane, Plumstead (for the Kent and Suburban Estates Company, Limited).—Agreed.

*Working-class Dwellings.*

*Bow and Bromley.*—Variations from the plans sanctioned by the Council on February 27, 1900, for the erection of a laundry and a block of three intended dwelling-houses, to be inhabited by persons of the working class, and proposed to be erected, not abutting upon a street, on a plot of land on the east side of Wellington-road, Bow-road, Bow, so far as relates to certain alterations and additions to such laundry (Mr. C. A. Brereton for the Whitechapel and Bow Railway Company).—Consent.

*Means of Escape from the Top of High Buildings.*

*Holborn.*—Means of escape in case of fire, proposed to be provided in pursuance of Section 63 of the Act, on the seventh and eighth stories of a block of residential flats known as Russell Priory, on the east side of Southampton-row (the upper surfaces of the floors of which stories are above 60 ft. from the street level) for the persons dwelling or employed therein (Mr. G. D. Martin for Mr. T. H. Brooke-Hitching).—Consent.

*Buildings for the Supply of Electricity.*

*Holborn.*—An electric sub-station, transformer-room and storage battery-room on the south-west side of Tower-street, Little Earl-street, Holborn (The Metropolitan Electric Supply Company, Limited).—Consent.

*City of London.*—A distributing station on a site at the rear of Nos. 82 to 84, Fenchurch-street, City, to abut upon Carlisle-avenue (Messrs. Clifton, Son, & Hope, for the Charing Cross and City Electric Company, Limited).—Consent.

*Height of Buildings.*

*Hammersmith.*—That the application of Mr. C. G. Miller for an extension of the period within which the re-erection of the Swan public-house, No. 40, Broadway, Hammersmith, with a portion of the new building to abut upon Beadon-road and to exceed in height the distance of the wall of such building from the opposite side of that road, was required to be commenced, be granted.—Agreed.

*Construction of a Cabmen's Shelter on the Victoria Embankment.*

*Strand.*—A cabmen's shelter on the Victoria Embankment, near Savoy-street, Strand (Mr. T. S. Stahlschmidt for the Committee of the Cabmen's Shelter Fund).—Consent.

## TECHNICAL EDUCATION IN GALICIAN AUSTRIA.

MR. JAMES BAKER, F.R.G.S., whose reports to the Board of Education on technical education in Berlin and Posen were noticed in the *Builder* of January 4, has also written a description of the technical and commercial schools in Galician Austria. He tells us that in Cracow, which is a town of 83,000 inhabitants, there are for technical education the Staatsgewerbe School, with 204 scholars; the Fortbildungschule, with 140 pupils; a locomotive school, with forty-nine; an art school, and five town continuation schools, with 800 pupils; also a Handel, or commercial school, with 160 pupils. The cost of the building for the Gewerbeschule, which was built in 1898, was about 5,000*l.* The apprentices of the town are compelled to go to the continuation or Fortbildung schools, and in the Gewerbe or trades schools poor scholars are assisted by thirteen State scholarships of 150 gulden (12*l.* each), and ten provincial and four private scholarships of the same amount; and, besides, there is a yearly sum of 350 gulden (28*l.*) for poor scholars. The principal trades of the town and the district, which latter is largely agricultural, are building, lithography, printing, and wood furniture, and iron-work for art iron production. These subjects are taught in the Gewerbe school, which is divided into three Fach, or trade divisions, *i.e.*, building, technical mechanics, and technical chemistry

The Fortbildung or continuation artisan school is held in the winter from October to May in the evening from seven to nine, and on Tuesdays from nine a.m. to noon. It is divided into four sections the first being for building; the second for metals; the third for art cabinet work, art metal work, art goldsmith and bronze work, and carving; and the fourth for painting, engraving, and photography. A special course is held for locomotive machine work; and, in addition, a Werkmeister's school—that is, a school for master workmen who are no longer apprentices, is about to be established. In ascending the wide staircase of the building Mr. Baker noted some bold decoration in Sgraffitto work on the walls, and a good cast of a sphinx at the foot of the stairs, and he was told all this was the work of the scholars. In one room the pupils were composing and designing decorations for walls; an example of a leaf was given and then they had to produce a design. Others were drawing working plans for cabinet work, and, even by the first-year pupils of

fourteen to seventeen years of age, some excellent work was being produced. In the builders' and architects' sections, plans and projections were being given, such as a corner house for such and such uses. Each pupil sketches out his own idea, and every detail is worked out, doors, balcony, &c., and the material varied of stone or brick, or the two combined.

It is noteworthy that in these Imperial Royal schools, in the obligatory studies enforced by the Government, the first subject is the Polish language, then comes the German, and in the first year's course the other subjects are geography, mathematics, and physical geography, and a study of the oro-hydrographical and climatic conditions of the earth, and lessons upon the principal trade and commercial districts, algebra and geometry and geometrical drawing, experimental physics, chemistry, and free-hand drawing. Thirty-six hours a week are given to these subjects in the first year's course. In the second year the same subjects are taken, an advance being made; and in the building section, building construction and freehand drawing of architectural models, and in the technical mechanical section, mechanics and freehand drawing, with special attention to sections, parts of machines, &c., are added; with every fortnight a practical course in the workshops. In the chemical technical section general and analytical chemistry and mechanics are added, with six hours weekly in the laboratory; and mineralogy, geognosy, and freehand drawing in the mechanical section. In the third year in the building section the architectural work is developed, and knowledge of architectural form is added, dealing with columns, gables, façades, &c. In the fourth year book-keeping is taught to all sections, and in the building section the subjects are carried on to the more elaborate studies—as Greek, Roman, and Eastern architecture—and in mechanics the study of the newest agricultural machines is introduced, and civil engineering in connexion with roads, bridges, water conducting, damming, &c., is studied; whilst in chemistry such subjects as artificial manures, fat and mineral oil industries are studied, and twenty-two hours a week are given to practical laboratory work; whilst to the chemistry of agriculture is allotted three hours a week. Each year the pupils are taken for a four days' excursion into the big factories of the province to study the work done there, and lesser excursions are made in and near Cracow to study especially, and make sketches of, the buildings. Students from this school are taking up good positions in various parts of Europe, and Mr. Baker significantly remarks that although "when first the schools were started both parents and pupils were reluctant to give the time for this education, now they are eager to obtain it." He adds that "the education is especially adapted to the requirements of the locality, and this localising and decentralising of education is carried out most successfully throughout the Austrian Empire." Mr. Baker also visited Lemberg, the capital of Galicia. This is a town of but 130,000 inhabitants, yet, as the capital of the province and the seat of the Diet it has very numerous public buildings, and its schools would astonish the inhabitants of an English town of the same size. The Gewerbe or trade technical school is an important building, with wide corridors and spacious classrooms, giving instruction to 438 pupils, with a staff of thirty-three professors and werkmeisters or teaching foremen. The original cost of the building was 24,000*l.*, and of the site 8,000*l.* The yearly cost of the professors is about 4,000*l.* The hours of tuition are, in the winter, from 8 a.m. till noon, and 2 p.m. till 7 p.m.; and in summer from 7 a.m. till noon, and from 2 p.m. till 7 p.m. To be admitted the students must have passed through six classes of a Volksschule if trained in a village, or seven classes if trained in town. Then they have to pay one gulden (1s. 8d.) entrance fee, and four gulden yearly; if they are poor but industrious these fees are remitted. The artisans are most eager to send their children to this school, but the trades people still strive to get their children into the Gymnasium. The aim of the Gewerbe, as set forth in its statutes, is to give a professional, theoretic, and practical training to industrial workers or apprentices, and to train tradesmen and artisans in the special trades for which lectures and practising workshops are established; likewise to offer to all the opportunity to study and perfect themselves in drawing and modelling, and to give apprentices the opportunity to gain such a full knowledge of their trade that they may assimilate this knowledge with their practice in the factory or workshop. The school comprises four divisions:—(1) building trades; (2) art trades; (3) modelling; (4) continuation classes. Division 1, *i.e.*, the building trades' school, is divided into:—Section A (1) for general minor building work; (2) for carpentry; (3) for stonemasonry; and Section B, which is a school for builders, carpenters, and locksmiths, divided into two parts, where theoretic and practical workshop work go on together for three years of two half-year courses each. In the art of building the three classes of artisans—builders, carpenters, and stonemasons—are most carefully instructed. Lectures and drawing are divided for the first half-year equally—four hours each; for the second half-year five hours are given to lectures and eight to drawing for the builders and carpenters, and for the stonemasons three to lectures and six to drawing. In the third half-year the builders have five hours lectures and twelve hours drawing, the carpenters the same, and the stonemasons four hours lectures and eight hours drawing; whilst in the fourth half-year the hours are, for the builders, two hours of lectures only. The course of study is most complete, commencing in the first half-year for all with technical terms, materials, stone and wood, trussing, stability of walls, ground floors, and roofs; the use of iron, &c.; and the drawing works in with this, with drawings to scale, &c., until in the fourth half-year elaborate buildings, with all the outward decorations and internal fittings, are worked out and studied, free scope being always given for individual expression and originality.

## Books.

*Theory of Engineering Construction: A Reference-book for Civil Engineers and Students.* By ERNEST H. ESSEX, Assoc.M.Inst.C.E. London: The St. Bride's Press, Limited.

NOTWITHSTANDING its somewhat comprehensive title, this volume is not, nor is it intended to be, a text-book on engineering construction. It is practically a series of five sample papers on the subjects in Part II. of the Examination applying to the election of Associate members of the Institution of Civil Engineers.

Forty-eight questions are selected by the author from amongst some already set by the examiners on the four essential subjects of theoretical and applied mechanics, the theory of structures, and the strength of materials; and three questions are taken on geodesy, which is one of eight optional subjects. Answers are written to these, and explanatory diagrams are included where necessary. Although the scope of the work is rather limited, the examples chosen refer to problems of general professional interest, and the solutions are well reasoned and lucidly expressed. As an adjunct to scientific text-books, the volume ought to be useful, and it may also be serviceable as a guide to candidates for examination. It is less likely to be adopted as a reference-book, in spite of a carefully compiled index, because so many of the points receive only such mention as may be incidental to the elucidation of the various problems under consideration. Two unnumbered blank pages occur after each answer, so that the student may insert other examples on any subject engaging his attention. We believe that very few people avail themselves in this way of interleaved pages, which are apt to constitute an inconvenience to the majority of readers.

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*Field Work and Instruments.* By A. T. WALMISLEY, M.Inst.C.E. London: D. Fourdrinier (*Builder* office). 1900.

*Land Surveying and Levelling.* (Same author and publisher.)

THESE are two more of the *Builder* Students' Series, the contents of both of which have appeared in the "Student's Column" of the *Builder*, and are issued in book form with revision by the author.

In the work on levelling and surveying the object has been to provide an elementary treatise which will be useful for those intending either to be architects, engineers, or surveyors. Mr. Walmisley remarks truly, in his preface, that "part of architecture consists in the consideration of a site with a view to placing a building on the land; and in the case of a mansion to be built on a new estate, an architect who surveys the estate himself will know much more about the ground than one who, without inspecting the site, has employed a surveyor to do the survey for him."

The subject of field work and instruments is a natural sequel—or shall we say a preface—to a work considering the subject of surveying generally. Many of the younger school of architects of the day are, we fear, little at home in the handling of the level and theodolite—instruments of great interest in themselves, as well as in their practical application for reducing the facts about a site to graphic form.

Mr. Walmisley's name is so well known as an authority on these subjects that no recommendation of him on our part is necessary.

We may mention that a good many new illustrations have been added in the books, besides those which originally appeared in our columns.

*Mathematical Drawing Instruments.* By WILLIAM FORD STANLEY. Seventh edition. London: E. & F. N. Spon. 1900.

WHEN the first edition of Mr. Stanley's useful work was written, about thirty-five years ago, it was the object of the author to place on record what he really knew, as a practical maker, on the subject of drawing instruments, hoping that his book might prove of practical value to professional readers. That this hope has been fully realised is known by all who are acquainted with the work, and is evidenced by the appearance of the present edition, in which about one hundred pages of new matter, with many illustrations, have been incorporated, with the object of describing the most modern types of instruments and appliances used in the drawing office. At the same time, we observe that references to various obsolete instruments have been omitted, so that the volume is now thoroughly up to date in every respect. Many of the appliances illustrated are only required for special classes of work; and as to ordinary instruments, it may be remarked that as the draughtsman adds year after year to his life, he not infrequently seems to grow less appreciative of those elaborate aids which appeared so desirable in his younger days. Mr. Stanley wisely advises persons with limited means to buy good instruments separately, "as they may be able to afford them;" perhaps he might have added with advantage the words, "and as they may find the need for them." The last four chapters contain hints of especial value to students on drawing materials, colouring, sun-printing, lettering, and similar subjects.

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*The Practical Engineer Electrical Pocket-Book for 1901.* Manchester: The Technical Publishing Company.

SEVERAL additions have been made to this useful book. The section on the gearing of motors has been made thoroughly modern, and the tables given will simplify the calculations for the choice of suitable wheels for reduction gear. It would be better to omit the difficult methods given of measuring mutual and self inductance, as they require costly and elaborate apparatus.

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*Fifteen Studies in Book-keeping.* By WALTER W. SNAILUM. London: C. J. Clay & Sons. 1900.

INTENDING students of book-keeping have already a rather large selection of works to choose from, and we find much that appears familiar in the pages before us; but in a work designed to instruct the novice, as well as to assist the more advanced student, and starting, consequently, with elementary principles, this is, of course, only to be expected. There is, however, an unusual variety in the selection of exercises and examples enabling the student to apply the principles to practice, which tends to render this work especially serviceable.

The "fifteen studies" are supplemented by a series of worked examination papers and test exercises, dealing with widely differing kinds of accounts—including, we notice, a month's transactions of a firm of contractors—and, while the same principles may govern the business records of a grocer and a builder, it is obviously a distinct advantage for the illustrations to comprise as many trades as possible.

In the papers given for solution, certain questions appear on matters of finance which are not dealt with in the text; and we assume that their inclusion is due to its being deemed desirable to set forth the papers in their entirety. The student will find both the "studies" and exercises of great assistance in preparing for examinations, and a fair equipment for ordinary commercial book-keeping. The other questions to which we have alluded will serve to show the necessity of enlarging his studies, in the event of his aspiring to the higher branches of book-keeping.

## BOOKS RECEIVED.

SANITARY INSPECTORS' FIELD BOOK. By H. G. Keywood. (R. Poole: Maldon.)

ARCHITECTURAL REMAINS OF RICHMOND, TWICKENHAM, KEW, PETERSHAM, AND MORTLAKE. Drawn by Thomas R. Way, with notes by F. Chapman. (John Lane.)

THE MECHANICAL TRIUMPHS OF THE ANCIENT EGYPTIANS. By Commander Barber, U.S.N. (Kegan Paul & Co.)

# Correspondence.

*To the Editor of* THE BUILDER.

## CLERKS OF WORKS AND BUILDERS.

SIR,—In the last issue of the *Builder* is a report of a paper read by a builder before the Bristol Society of Architects, in which some remarks about Clerks of Works occur.

I cannot remember ever seeing in print, except in reports of law cases, a builder's opinion of clerks of works, and for that reason and for the inferences to be drawn from them, they are unique.

On many occasions in these columns the duties and the responsibilities of clerks of works have been discussed by architects, and by surveyors, and even by clerks of works themselves, and now at last we are allowed to know what a builder thinks it right to say about us.

Some day we may be privileged to hear what our real employers, building owners, think about us, and then our cup of joy, or otherwise, will be filled!

Clerks of works have got quite accustomed to hear opinions expressed about them by builders, but hitherto those opinions have been conveyed, as the lawyers say, *viva voce*, and the words used and the tone adopted are usually trenchant; but clerks of works are a thick-skinned race, and one of their chief qualifications is to be able to submit calmly to insult. Therefore, nothing in the report referred to will excite feelings of annoyance, but it may cause some surprise that a builder, presumably of experience, should say "My own idea is that the clerk of works should be the architect's representative." Now, whom does the clerk of works down Bristol way represent, if he does not represent the architect?

Really, the author of the paper must have come in contact with some queer specimens of the genus, if they are not "prepared to obtain and give all information necessary to the proper carrying out of the contract," so far as it appertains to their duties. But clerks of works should, in my opinion, confine themselves to their own duties as such, and not place their knowledge and experience at the disposal of builders who, taking advantage of good nature and courtesy, will frequently obtain from them assistance that ought to be supplied by their own foremen. I have heard builders say that a first-rate clerk of works is the best foreman on the job, and so he is, if by being willing and able to render assistance outside his own duties the builder escapes the necessity of paying for proper superintendence.

For every builder who suffers by a clerk of works there are, I think, two clerks of works who have their duties nearly doubled by incompetent builders.

The author goes on to say that "one man may make the work cost 5 to 10 per cent. more than another." That I utterly deny. It is impossible for any man to do that, because the wording of all specifications and contracts that I have seen distinctly and repeatedly says that everything is to be of the best and, presumably, the most expensive of its kind, and no man can make a builder do work or supply materials better than the best. If the author had said one man may let the work cost 5 to 10 per cent. *less* than another I would not have disputed it; but whether that type of man is of any use to architects and owners is another question.

I do not think it advisable to pay clerks of works so much per contract. It sounds plausible, but it would not work out very satisfactorily. Architects would not "find their works executed with much more promptitude and despatch." A system of that kind would, in my opinion, lead to scamping and connivance. Clerks of works are not consulted by architects about the duration of time allowed, and, although a vigilant clerk of works may keep a sluggish builder up to concert pitch, nothing that he can do will cause a builder who knows his business to drag a job along. Unfortunately, dragging along is more frequent than pushing ahead, but the causes for that must be looked for elsewhere than in the conduct of a

CLERK OF WORKS.

NEW BATHS AND A BRANCH LIBRARY FOR LEEDS.—At a meeting of the Baths Committee of the Leeds Corporation recently, a rough estimate was submitted of the cost of erecting a building to serve for baths and library in York-road, and for new bath premises in Broad-lane, Bramley. Sites have been already purchased, and, exclusive of this outlay, the cost will be, in York-road, about 15,000*l.*, and at Bramley about 8,000*l.* If the City Council sanction these proposals, as the committee recommend, designs will be invited, with an offer of premiums of 50*l.*, 30*l.*, and 15*l.*, in the former case, and 30*l.*, 20*l.*, and 10*l.* in the latter. Mr. Braithwaite, architect to the Leeds School Board, whose advice had been sought, reported as to the best method of repairing the leakages at the Union-street and Kirkstall-road baths. Both these baths were opened in 1895. The committee will recommend that the work be taken in hand as early as possible. Tenders for painting the Kirkstall-road and Holbeck Baths were accepted from Messrs. Gaunt.

# The Student's Column.

## SANITARY FITTINGS AND PLUMBING.

### 4.—SANITARY POTTERY.

GLAZED ware of different kinds is now so much used for sanitary fittings, that a short description of the principal varieties cannot fail to be of service.

The material most commonly used for the cheaper kinds of fittings is salt-glazed fireclay. The glaze is produced by throwing common salt into the kiln during the last stage of firing. The salt is decomposed by the heat and fills the kiln with dense fumes of salt-vapour, which enter into chemical combination with the silica on the surface of the clay, producing a thin glaze of silicate of soda; the glaze is, therefore, a portion of the fireclay itself, fused or vitrified under the influence of salt. A salt-glaze has the advantage of being thoroughly incorporated with the material to which it is applied. On the other hand, it is not very smooth, as roughnesses or inequalities in the plastic clay are still apparent in the finished production. Fireclay is a somewhat brittle material, and sharp corners may be chipped off by a blow, even though glazed. For this reason all external angles ought to be rounded. The colour of salt-glazed ware is generally some shade of reddish brown, with a mottled appearance.

Doulton-ware is a salt-glazed stoneware, which is claimed to be a denser material than ordinary fire-clay. The term "stoneware" ought really to be applied only to ware which is vitrified throughout, and not merely glazed on the surface.

The materials already described are largely used for the cheaper kinds of sinks, urinals, school lavatories, latrines, and water-closets, and also for heavy fittings for factories and other places where rough usage is likely to occur.

A better surface is obtained by means of porcelain enamel, which is a thin film of porcelain fired on to the fireclay or "earthenware" body. The piece of fireclay, modelled to the required shape, is burnt in the kiln in the usual manner without the addition of salt. It is then known as "bisque" or "biscuit" ware, from its porous appearance, and the enamel is applied by covering the surface (generally by dipping) with the liquid slips and glazes necessary to produce the porcelain enamel of the required kind and colour. The article is again fired in a kiln, in order to fuse the materials applied to the surface and convert them into a thin sheet of porcelain, which, if the process has been properly carried on, will be thoroughly adherent to the "biscuit" body. In many cases, however, the enamel is far from satisfactory. It may be cracked in firing, or may be so loosely adherent to the body as to be easily flaked off by a blow or by frost. Enamelled bricks are generally made in this manner, and the enamel of inferior qualities frequently fails by flaking off. In this, as in so many cases, cheapness in first cost is not always true economy. It is better to pay a fair price for a sanitary fitting made by a firm of good reputation than to buy a cheap fitting made no one knows where.

Enamelled ware of this kind is used for sanitary fittings of medium quality and also for very heavy fittings of the best class, such as urinal-stands, large sinks, and baths. In some cases the goods are sorted into two or more qualities, the inferior ware being defective either in shape or in the enamel.

With the exception of these heavy fittings, the best sanitary goods are made of some kind of white earthenware or pottery suitably glazed. Different manufacturers use slightly different mixtures of clays, flints, &c., and adopt distinctive names, among which may be mentioned "Queensware," "Titanite," "Vitrina" ware, and "Vitro-porcelain." For convenience they may all be classed together as whiteware or porcelain. It is practically the same material as that used for ordinary household crockery, and, like this, varies in strength, correctness of form, firmness, and durability of glaze, and in other respects. The quality of the pottery must be considered in appraising the value of sanitary ware, exactly as in the case of plates and dishes.

The manufacture of a piece of sanitary pottery of this kind is not by any means a simple matter. Failures innumerable have occurred in arriving at the results which are now possible, and the greatest skill and care have still to be exercised in order to produce a perfect piece of work. A brief description of the method of manufacture adopted at Twyford's Cliffe Vale Works, Hanley, will show what skill and care are required. The selection of the ingredients is the first step in the process. These consist of kaolin or china clay, blue or ball clay, flints, and Cornish stone. Kaolin is the finest kind of clay, and is prepared from decomposed granite or felspathic rocks; it contains a certain amount of potassium, and gives fineness of texture and plasticity to the final mixture. Blue or ball clay is a fairly pure hydrated silicate of alumina, and is therefore a true clay. It is of dark grey colour, but burns white, and is introduced to give strength to the mass. Flints are pure silica, and are added to give rigidity and to control contraction. Cornish stone is a partially-decomposed granite, and serves as a flux under the influence of fire.

Each of these ingredients has to be prepared separately. The flints must first be calcined, then crushed, and ground between hard stones in water. The Cornish stone is similarly treated, except that it does not require calcining. The clays are disintegrated and purified by agitation with water. In each case the material must be so finely triturated as to be held in suspension by the water. The four liquids are then mixed together in proper proportions, which vary according to the nature of the earthenware required and according to the amount of solid matter in suspension. To this mixture metallic oxides are added when it is desired to give colour to the body of the ware. Coarse particles are removed from the "slip" by passing it through wire and silk sieves; and fine particles of iron, which would render the earthenware speckled, are extracted by running the slip along a trough in which a number of magnets are placed. A large proportion of the water in the slip is then removed by means of filter-presses, from which the clay is taken to the pug-mill. This is a cylindrical apparatus with revolving steel knives, by which the clay is reduced to uniform consistency, and from which it is forced in a plastic state, ready for the potter.

Before the potter can use the clay, he must have full-size plaster models of the various parts of the articles to be made. It is impossible to mould a complicated piece of sanitary ware in one piece. The ware must be built up in pieces, each of which must be separately moulded. The clay is "pressed" firmly into the moulds, so that it will be absolutely homogeneous, and then the operation of "sticking-up" is performed, whereby the different pieces are joined together. If this operation is not well done, the joints crack during firing. The "Twycliffe" water-closet basin is composed of no fewer than thirty-two pieces, separately moulded and then "stuck" together. After partial drying the ware is "fettled" by "trimming the edges with a knife, sponging out all mould marks, and finally finishing with a piece of horn until the surface is perfectly smooth." The ware is then dried at a moderate temperature, and is afterwards dressed by rubbing gently with very fine sandpaper.

It is now ready for the kiln. Great care has to be exercised in placing the articles in the kiln. They are protected by enclosure in earthenware "seggars." The temperature of the kiln and the duration of the firing have also to be carefully regulated. But into this part of the process of manufacture we need not enter.

The ware leaves these kilns in the "bisque" or "biscuit" state, and is then stored in a warehouse and carefully examined. Damaged pieces are thrown out, and pieces containing slight cracks, which can be stopped, are marked and passed on to women who clean the pieces and repair the defects with liquid stopping.

The ware is now ready for printing or decorating, or (if it is to be left plain) for dipping into the liquid glaze. This is prepared from ground flints and other ingredients, and is of such a composition that, on firing at a high temperature, it forms a thin coat of glass on the surface of the pottery. The glaze generally contains a certain amount of lead, and this renders the process of dipping a dangerous one, unless careful precautions are taken and absolute cleanliness observed by the work-people. After being dipped, the ware is

Fig. 1.

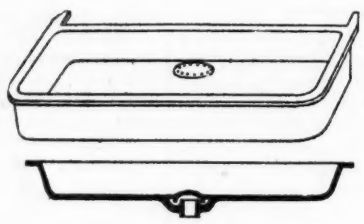


Fig. 2.

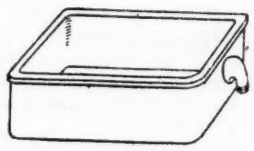


Fig. 3.

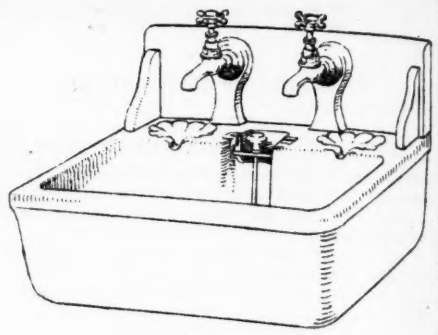


Fig. 7.

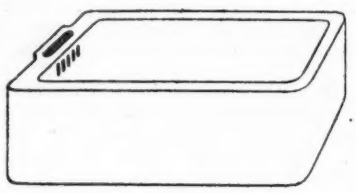
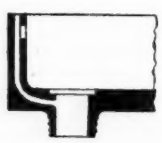


Fig. 4.



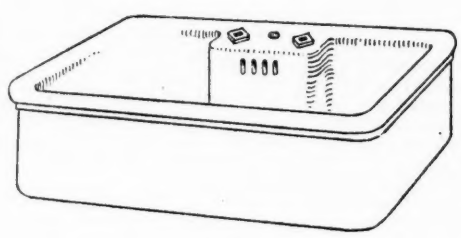


Fig. 5.

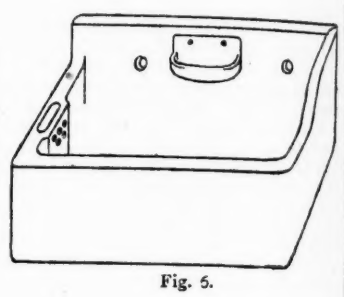


Fig. 6.

*Illustrations to Student's Column.*

touched up by means of a camel-hair pencil, and the glaze is sponged off those parts which are to be left unglazed. The ware is then dried at a moderate temperature, and the process of manufacture is completed by burning it again in kilns to fuse and fix the glaze. This operation requires great care both in placing the ware in "seggars" and in regulating the temperature and duration of the firing.

This brief outline of the process of manufacture will serve to show that good sanitary ware is difficult to produce, and is necessarily costly. If a good piece of pottery is required, a good price must be paid for it.

The pottery which has just been described has a more or less porous body protected by a thin coating of glass, but within recent years attempts have been successfully made to produce ware which is practically vitrified throughout, and is therefore non-absorbent. This is a valuable improvement, as it sometimes happens that the glaze is not perfect throughout the hidden parts of a complicated piece of pottery, or that, if perfect when it leaves the kiln, it is subsequently damaged. In such cases a porous body is apt to become foul. Non-absorbent ware of this kind is now made by manufacturers of the best sanitary pottery, but under various names, such as "vitrina" and "vitro-porcelain." It is slightly more expensive than ordinary ware.

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## 5.—SINKS.

SINKS are of various kinds. Among these may be mentioned (1) the sink-of-all-work, commonly known as a scullery or kitchen sink, which, being without a waste-plug, does not hold water; (2) the sink with waste-plug and overflow, often known as a butler's sink; (3) the nursemaid's sink, which is merely a variety of the butler's sink; (4) the vegetable sink; (5) the sink for washing pans and other hardware; (6) sinks for special purposes, such as laboratories, photographers' studios, operating rooms of hospitals, &c.; and (7) the housemaid's sink, which is generally fixed in connexion with the slop sink, and will be more conveniently described in the chapter on fittings of the latter kind.

The different materials used for sinks include stone, slate, glazed ware of various kinds, cast and wrought iron, tinned copper, wood, and wood lined with tinned copper or lead. There is not one of these materials which can be considered perfectly suitable for every kind of sink, but the most generally serviceable material is good glazed ware, which has the great advantage of cleanliness. The chief objection to such ware is its hardness, which results in damage being done to delicate crockery and glass. This danger can, however, be much reduced by the use of wood grids and drainers, as will be hereafter explained.

1. *Scullery Sinks.*—In small houses the sink is often the only sanitary fitting which can be afforded. Such sinks are of the ordinary type without either plug or overflow. In former years they often consisted of a solid slab of stone with a portion dished out to a depth of 3 in. or 4 in., but this material, although durable in a sense, has the disadvantages of being pervious to moisture, and therefore difficult to keep clean, and of wearing away in places so that the water will not flow away to the waste outlet. Salt-glazed or enamelled fireclay is now generally preferred on account of its greater cleanliness. Sinks of this kind are commonly oblong, ranging in size from about 20 in. by 15 in. to 48 in. by 24 in., the outside depth being 5 in. to 6 in. The stock sizes of different manufacturers vary, so that it is now possible to obtain from stock a sink of almost any dimensions. Angular sinks of the shape shown in fig. 1 are also made.

The defects to be avoided in these and other pottery sinks are *sharp arrises*, as these are often damaged in transit or by contact with heavy pans, *sharp internal angles*, which render the cleaning of the sink more difficult, *warping*, which is often so serious as to prevent the water running to the waste-outlet unless the sink is purposely placed out of level, *cracks* in the body of the ware, and *flaws* in the enamel.

Kitchen sinks of this type are also made in cast iron, either finished black, or galvanised, or enamelled. The example given in fig. 2 cannot be recommended, as the trap is of the "bell" form. Such a trap is objectionable for several reasons:—The flow through it is so sluggish that the trap is not self-cleansing; the depth of seal is only ¼ in., and the seal is therefore easily lost by evaporation; and the bell grating is often removed (for the purposes of cleansing the trap and expediting the discharge of the water from the sink), thus admitting more or less impure air through the waste-pipe into the house.

Porcelain-enamelled iron sinks are easily damaged, as the enamel chips off under a comparatively light blow or if very hot water is suddenly poured on to it. Galvanised iron is better, unless the water is soft moorland water, when the coating of zinc is soon eaten away and the iron exposed to the corroding influences of moisture and air.

2. *Butlers' Sinks.*—Sinks of the kind already illustrated are really nothing but fittings for the reception of the foul water poured from vessels of different kinds, and of water dripping from the taps or draining from articles which have been washed. They do not hold water, and "washing-up" must therefore be performed in a vessel of wood, papier-mache, or metal, placed in the sink. Such an arrangement is often inconvenient, and in large establishments is practically unworkable. The desired improvement is obtained by fitting a plug to the waste outlet, so that the sink will retain water, and this alteration necessitates an overflow, so that, if a tap is left running when the waste is closed, the water can escape without overflowing the sides of the ink. A sink of this kind is shown in fig. 3; the overflow is of an old-fashioned type, consisting of a pottery bend (in one piece with the sink), to which a lead pipe can be attached to convey the water to the sink side of the trap, or (if the local regulations demand) the lead pipe can be taken straight through the wall to the open air. These sinks can be obtained from 15 to 27 in. long, 12 to 16 in. wide, and 7 to 10 in. deep, outside measurements.

Overflows of this kind cannot be kept clean, and a much better arrangement is shown in fig. 4, which is often known as the "Belfast" pattern. In this case, the overflow is formed in a projecting portion of the pottery, and is continued up to the top of the sink, so that a small wire brush can be inserted to cleanse the passage. A porcelain or metal cap to cover the top of the opening is of service in preventing the ingress of substances which might choke the overflow. These sinks are made from 24 to 48 in. long, 16 to 24 in. wide, and 7 to 12 in. deep. In fig. 5 the overflow is placed in a projection inside the sink, and the same projection affords space for the water-taps and the standing waste. This is made by Doulton & Co. in two sizes, 30 in. by 18 in., and 36 in. by 24 in., both 8 in. deep. The roll edge is much less likely to be chipped than a square arris.

Cast-iron sinks, with overflows similar to that shown in fig. 4, are now made in sizes from about 15 in. to 36 in. long, about 14 in. wide and 7½ in. or 8 in. deep. Semicircular and quadrant sinks can also be obtained. The iron is finished by painting, galvanising, or enamelling with glass, porcelain, or coloured vitreous enamel. Some idea of the relative cost of these methods of finishing will be gathered from the following list prices of a sink 36 in. by 14¾ in. by 7¾ in.—painted, 10s.; glass enamelled, 18s.; vitreous enamelled, 25s.; white porcelain enamelled, 32s. 6d.

Sinks with high backs, such as that shown in fig. 6, have the advantage of preventing a certain amount of splashing, but the taps must not be fixed so low as to render the drawing of water into ordinary vessels an impossibility. Sinks with raised sides are also made as shown in the right-hand portion of the illustration. The sizes range from 24 in. by 14 in. by 10 in., to 48 in. by 24 in. by 12 in., the raised backs and sides being 5 in. higher.

Shanks's new form of sink, illustrated in fig. 7, contains an improved overflow of large size readily accessible for cleansing, and a pull-up waste which can be removed with the greatest ease; to open the waste, the knob, carrying a crossbar which slides in metal grooves embedded in the pottery, is raised and moved backward so that the cross-bar rests on the horizontal portions of the grooves, and the removal of the waste is effected by raising the cross-bar through the upper vertical portions of the grooves. The sink is supplied either with or without the raised back, and measures

25 in. by 19½ in. by 9¼ in. deep. It can be supported on a central pedestal, or on iron standards or wall-brackets.

## *OBITUARY.*

MR. JOHN BURNET.—We regret to have to record the death, on January 15, in his eighty-eighth year, of Mr. John Burnet, of St. Kilda, Dowanhill, Glasgow. Mr. Burnet was elected Fellow of the Royal Institute of British Architects in 1876. He was an original member of the Glasgow Institute of Architects, of which he was President in 1876-8, and a member of Council during many years. Mr. Burnet was father of Mr. John James Burnet, A.R.S.A., of Glasgow, and senior member of the firm of Messrs. John Burnet, Son, & Campbell. Of architectural works carried out by that firm the following have been illustrated in our columns: The Western Infirmary, the new Barony Church, and the Athenæum (two views), Glasgow (July 9, 1898, "Glasgow," No. XVI. of our series of "The Architecture of our Large Provincial Towns"); and Athenæum, Glasgow, with plans (October 21, 1893); competition designs, by the then firm of John Burnet & Son, for the Birmingham Law Courts (August 14, 1886), and Model Dwellings, Cathedral-court, Rotten-row, Glasgow (October 15, 1892). The firm were the architects also of the Art Gallery, Glasgow (J. Burnet & J. J. Burnet), a church at Stenhousemuir, Stirling, to commemorate Dr. McLaren's jubilee (John Burnet & Son); and in Glasgow: the Pathological Institute, the Subway Station near Glasgow Cross, Albany-chambers and Cross-mansion, the Savings Bank in Ingram-street, the Clyde Trust Office, the Merchants' House, the Stock Exchange, the Union Bank, the Clydesdale Bank, and the Woodlands-road United Presbyterian Church. The Public Baths at Alloa, planned and designed by them, were completed in May, 1898. Mr. Burnet was, we believe, the author of the plans for the restoration of Arbroath Church that were approved in December, 1893; and he designed several mansion-houses in the neighbourhood of Glasgow and the West of Scotland.

## *GENERAL BUILDING NEWS.*

RESTORATION OF GARVESTON CHURCH, NORFOLK.—The parish church of Garveston has been partially restored. The work has been executed by Messrs. Springall & Son, of Swanton Morley, from plans prepared by Mr. A. J. Lacey, of Norwich.

CATHOLIC CATHEDRAL FOR LEEDS.—We understand that the plans for the new Roman Catholic Cathedral in Leeds will be deposited with the city authorities for their approval in the course of a few days. The building, which is to take the place of St. Anne's Cathedral—scheduled in connexion with the Cookridge-street improvement—will occupy the site lying between the new Masonic Hall and Cookridge-street. It will be in the Early English style. Solidity and simplicity appear to have been aimed at in the designs. The presbytery, or clergy house, forms part of the church building. One remarkable feature will be the provision of double side aisles, an arrangement which has been made possible by the comparative breadth of the site in proportion to its length. The cathedral, both inside and out, will be built of stone, and the main entrance will be from Cookridge-street. It is anticipated that about two years will be required for the completion of the scheme. The schools, which were opened in the forties by Daniel O'Connell, are also to be demolished, and new ones will be erected on a more convenient site in the parish. It is understood that the authorities of the cathedral will receive about 46,000*l.* from the Corporation in addition to building sites, and of this sum it is estimated that about 33,000*l.* will be spent on the cathedral and presbytery. The architect is Mr. J. H. Eastwood, of Kensington.—*Yorkshire Post.*

BOARD SCHOOLS, WEST HARTLEPOOL.—The Lister-street Board schools at West Hartlepool were opened on the 20th ult. The schools give accommodation for 1,502 scholars, and have cost 18,909*l.* They are on the central hall system, and were designed by Mr. Percy Hinde, of Liverpool. Mr. Beetham, of West Hartlepool, was the principal contractor.

BOARD SCHOOL, BLACKPOOL.—The foundation-stone has just been laid of a Board school in Devonshire-road, Blackpool. Mr. R. B. Mather is the architect, and Messrs. Cardwell Bros. are the contractors.

NEW BANK AT ROCHESTER.—The Capital and Counties Bank, Limited, have just opened a branch at 69, High-street, Rochester, opposite the post-office. Part of the building is of Elizabethan date, extensively altered and partly rebuilt in the eighteenth century and subsequently. In excavating to form the strongroom fragments of Roman pottery were found at a considerable depth below the present level. The house is well known on account of its then owner, Sir Richard Head, having given hospitality to James II. in December, 1688, and from it the fugitive king escaped to the river and so to France. The house and large garden will be occupied by the manager, while a portion of the ground floor, until recently used as a shop, has been altered for the purposes of the bank. The shop front has been replaced by a front of Portland stone, simply treated with the arms of the bank carved over the entrance doorway. The walls inside were partly lined with eighteenth century large deal panels; these have been repaired and completed. The new doors, counter, and fittings are of oak. The counter affords accommodation for two cashiers, and is protected by a brass grille. The floor in front of the counter is paved with Rust's vitreous mosaic, the remainder with wood blocks. The window of the manager's-room has been filled with glass bearing upon it the arms of the present owners, the past owner, Sir R. Head, and his guest, James II., and others. A lavatory for the clerks has been built at the back, and a strongroom in the basement. The wood-block flooring is by Turpins Company, the heating by Jones & Sons, the brasswork by Vaughan & Brown, metal casements and glazing by R. E. Pearse & Co., and the strongroom door by the Ratner Safe Company. The builders are West Brothers, of Strood and Rochester, and the architect Mr. E. F. Cobb, of Rochester.

WATER COMPANY'S NEW OFFICES, SOUTH SHIELDS.—This proposed building is planned in two departments, communicating, one for office and public use, and the other for workshops. The building has elevations to Chapter-row and the Market-place, the latter being built on the ground floor with polished red and grey granite. The upper stories are finished in red brickwork, relieved with moulded and carved stone work. On the ground floor there will be a large general office approached through a tiled hall. Communicating with the general office is a manager's room, strong-room, telephone-room, &c. The remainder of the ground-floor is devoted to workshops, &c. The first-floor is approached by a stone staircase, and contains a board-room, out-door inspector's and other offices, and additional workshops. On the top floor a suite of dwelling-rooms has been provided, together with further offices and store-room. The work, which is expected to cost between 7,000*l.* and 8,000*l.*, is being carried out by Mr. R. Allison, of Whitburn, from the designs and under the supervision of Mr. Henry Grieves, architect, of South Shields.

WORKMEN'S DWELLINGS, LIVERPOOL.—On the 22nd ult., at the Municipal Offices, Liverpool, Colonel A. J. Hepper held an inquiry on behalf of the Local Government Board into an application by the City Council of Liverpool for sanction to borrow 53,500*l.* for the erection of dwellings for persons of the labouring classes. It was stated that the present scheme of the Corporation was to provide for 3,056 dispossessed tenants. It comprised four houses in Arley-street, 114 in Kew-street and Newsham-street, ninety houses in Clive-street and Shelley-street. The houses would be of different sizes, the rents to range from 6s. 3d. per week for four-room dwellings, comprising a living-room, three bedrooms, and scullery, to 3s. 3d. a week for two-room dwellings.

MASONIC HALL, FRIOCKHEIM, FORFARSHIRE.—The new hall of the Bruce Lodge, No. 593, at Friockheim, was opened on the 19th ult. The building is in Gardyne-street, and was formerly a chapel. The necessary alterations were carried out, under the supervision of Mr. W. G. Lamond, of Friockheim, by the following contractors:—Mr. Charles Esplin, masonry; Mr. John Macbeth, joinery; Mr. Dargie, Arbroath, painting; Mr. William Wishart, slating, &c.; heating apparatus, Messrs. A. L. Peacock & Co., Dundee.

PUBLIC LIBRARY, STIRLING.—A public library is to be erected at Stirling, from plans by Mr. H. R. Taylor, of Messrs. Lessels & Taylor, Edinburgh. The cost is estimated at 6,000*l.*

FISH MARKET, CARDIFF.—The new market for fish, poultry, fruit, &c., in Working-street, Cardiff, is constructed of brickwork with Bath stone dressings. The building is 158 ft. long by 63 ft. wide. The hall is paved with concrete, and the walls are lined with white glazed bricks to a height of 8 ft., and above that with buff bricks. The lighting will be by electricity. Mr. W. Harpur, the Borough Engineer, designed the building.

## *SANITARY AND ENGINEERING NEWS.*

WATER SUPPLY, DANBURY, ESSEX.—Mr. M. K. North, an Inspector to the Local Government Board, conducted an inquiry, at Danbury, on the 23rd ult., into an application by the Chelmsford Rural District Council for sanction to borrow sums amounting to 4,430*l.* for water supply works for the parishes of Danbury, East Hanningfield, Little Baddow, Rettendon, Runwell, Sandon, and Woodham Ferris. Mr. J. Dewhirst, Surveyor, said that the new scheme was based on a report by Messrs. Taylor, Son, & Santo Crimp, of Westminster. That firm attributed the failure of the original scheme to an insufficient supply of water and to the faulty hydraulic gradients. The requirements of the district were estimated to be 47,700 gallons a day. He had found after two years' experience that the daily amount required was about 33,000 gallons. It was proposed to purchase thirty-three acres of land surrounding St. Thomas's spring. The daily supply from the two springs and collecting pipes to be laid from the springs across the common to the reservoir was estimated to be 58,880 gallons. They proposed to erect a reservoir holding 60,000 gallons on Danbury Common. The scheme has met with considerable opposition.

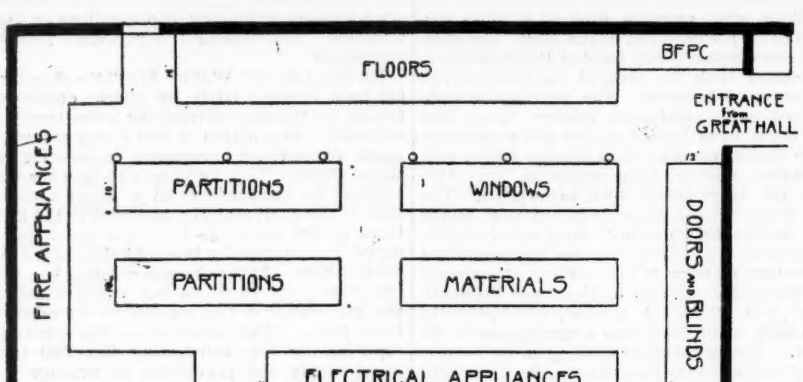
DOVER AND ITS WATER SUPPLY.—Some interest has been aroused lately by figures published with regard to the returns from the water supply works at Dover. As a matter of fact Dover seems to have made an excellent investment in securing its own water works. Year by year, although the water is supplied to householders at a much cheaper rate than in the great majority of towns in the kingdom, large profits are made from the municipal water supply and utilised for the reduction of the General District rate. At the Council meeting last week no less than 4,337*l.* profit on last year's water supply was transferred in this manner to the relief of the local rates. The surveyor on the same occasion reported the very satisfactory fact that increased meter supply and prevention of wastage in water had resulted in a saving of 579*l.* on the year. The returns made by the Borough Surveyor with regard to the water consumed at Dover are also interesting—especially to Margate, concerned as we are in regard to our own supply. It seems that at Dover during the year the quantity of water supplied for all purposes was 422¼ million gallons, 99½ million gallons being supplied by meter and the remainder, 322¾ million gallons, being for domestic supply, street watering, flushing, gardens, &c. He wished particularly to call attention to the great increase in the supply through meters. In 1894 the total supply was 321¾ million gallons; by meter 31 million gallons, and supplied other than by meter 291 million gallons. In 1899 the total supply was 434 million gallons; by meter 88½ million gallons, and supplied other than by meter 345¼ million gallons. In 1900 the total supply was 422¼ million gallons; by meter 99½ million gallons, and supplied other than by meter 322¾ million gallons. This showed the total supply per head in 1900 to have been 28·92 gallons. For trade purposes 6·82 gallons per head was used, which left a supply for domestic purposes, street watering, &c., of 22·1 gallons per head. The income derived from the sale of water by meter was, in 1894, 775*l.*; in 1899, 2,211*l.*; in 1900, 2,489*l.* By a comparison of the total supplies in 1899 and 1900 it would be seen that 11¾ million gallons less were supplied in 1900, although the meters showed an increase of 11 million gallons over the previous year. So that, apart from the increased meterage, the supply was 22¾ million gallons lower than in 1899, although a larger population was supplied. This was mainly due to the recommendations adopted by the Water Committee. On the basis of the rate charged for water, 25*l.* per million gallons, the saving amounted to 579*l.* The Surveyor further informed his Council that in 1894 the total consumption per head was 27·55 gallons.—*Thanet Times.*

## *MISCELLANEOUS.*

LONDON SCHOOL BOARD.—The usual weekly meetings of the London School Board were resumed on the 24th ult., after the Christmas recess. Lord Reay, Chairman, presided. *Rehousing.*—The Home Department, in reply to a letter from the Board on the question of their liability for rehousing in the cases of some of the properties scheduled by the Board, stated that the Secretary of State had given the subject most careful consideration, and decided that the numbers for whom the Board might be called on to provide accommodation would be: St. Matthew, Bethnal Green, 483; St. Leonard, Shoreditch, 293; St. Giles, Camberwell, 281; Bermondsey, 263; Mile End and Ratcliff, 510; total, 1,830. The length of time which had in some instances lapsed since the acquisition of the houses taken by the Board, the shifting of population, and the accommodation of some of the persons displaced in vacant tenements in the neighbourhoods, were also matters which had a bearing on the question of the number of new dwellings to be erected, and in the present case the Secretary of State in the exercise of his discretion was willing to agree to allow the provision of accommodation for a total of not less than 1,200 persons to be deemed sufficient. He would also be willing, if the Board desired it, to agree to their contracting with a Public Authority, or with a responsible company, for the erection of the buildings. The Board's liability would, however, not be removed, and the scheme would be the Board's and would have to be approved by the Secretary of State. It was resolved to accept the provision of accommodation as satisfying the Board's liability.

REGISTRATION OF PLUMBERS.—On Wednesday the 23rd ult. a deputation of members of the Parliamentary Committee of the Irish Trades' Congress waited upon the Right Honourable George Wyndham, Chief Secretary for Ireland, in Dublin, to urge his support of the aims of the Congress, including the registration of plumbers under statutory powers. In the course of a sympathetic reply, Mr. Wyndham expressed his sense of the importance of plumbers' work, and his opinion that a number of deaths and a great deal of disease were attributable to defective sanitation and to bad work by incompetent plumbers.

BUILDING TRADES' EXHIBITION.—The Fire Prevention Section at the Building Trades' Exhibition is now taking shape, and the arrangement of the




*Plan of the Fire Prevention exhibit for the Building Trades' Exhibition.*

Hall has been definitely decided upon. The Hall will practically be divided into groups as shown on the accompanying plan. The Hall is being redecorated, and should hence present a better appearance than is, unfortunately, generally the case with exhibitions of this description. If possible, arrangements will be made to bring the various exhibitors into line as to the displaying of their exhibits, and to place them in such a way that the different classes of materials are in close proximity to one another.

BRISTOL MASTER BUILDERS' ASSOCIATION.—The annual meeting of this Association was held on the 23rd ult. at the office in the Guildhall, under the presidency of Mr. E. Walters (vice-president of the Association). The Chairman moved the following resolution :—"That the members of the Bristol Master Builders' Association, at their annual meeting held at the Guildhall, Small-street, Bristol, on January 23, 1901, desire very humbly to convey their condolences to the members of her Majesty's august family in their great bereavement. Her Majesty has, during her long and successful reign, endeared herself to the nation, and the marked advances made in trade and commerce, both at home and in her Majesty's colonies and dependencies, will ever make Queen Victoria's reign stand out prominently in the annals of English history." Mr. G. Wilkins seconded the resolution, which was adopted, all the members rising. The Secretary (Mr. H. J. Spear) read the report, from which we extract the following :—An increase in wages of ½d. per honr has been granted all the way round, with the exception of the plasterers, to whom a rise had been granted in the previous year. A revision of the working rules has also taken place, and the rules have been signed by both parties. During the year the committee have devoted considerable attention to the revision of the schedule of daywork prices, and after several meetings a schedule was unanimously adopted, and the same has been circulated amongst the members of this Association, and also the architects, engineers, and surveyors of Bristol, and the School Board, Sanitary Authority, and other bodies. The question of depositing priced bills of quantities with tenders has upon several occasions been discussed, not only by the committee, but by the members of the Association generally, and it was definitely decided by the National Federation at their half-yearly meeting that no bill of quantities shall be deposited at the time of sending in the tender, and shall only be deposited when the contract has been signed, and then only under seal. The sub-committee of the Association has had under its consideration the question of an improved form of contract between the Corporation and the builders of the city generally. Numerous interviews have taken place between the Corporation officials, the solicitor of the Association, and others. It is hoped, during the course of the next few months, that a form will be agreed upon that will be mutually acceptable to all parties. The matter of apprentices is engaging attention, and it is hoped that at an early date a tabulated statement will be issued in respect thereto. The subject of the Workmen's Compensation Act is one which still remains very unsatisfactory. Prior to July, 1898, every workman laboured at his own risk, the master being liable to compensate only when the accident, broadly speaking, was due to the fault or negligence of himself or of someone in his service whom the workman had to obey. It seems, however, that this did not meet the case of the man who, without fault of his own, was injured at ordinary duties, and after much consideration by both political parties a Bill was produced, which, after Parliamentary discussion, became the Workmen's Compensation Act (1897). The original Bill was badly drafted, and a large number of amendments were made without full consideration of their secondary effects. In spite of all defects, however, the Act has been a great benefit to the men, and we do not believe that the masters would now repeal the measure if they could. The money cost of the liability has to be met by them in the first instance, but, like every other trade charge, it ultimately lands on the consumer. As a rule, the individual man is unable to maintain himself long when disabled, and the average master, however willing, is unable to do it for him. Both of these difficulties are met by this Act, which serves to spread the burden; the slightly enhanced price of commodities being really a small indirect tax on the community for the relief of those who are killed or wounded in its industrial service.—The Chairman proposed the adoption of the report and balance-sheet. Mr. W. Church seconded the resolution, which was carried unanimously. The Chairman referred to the absence of their president (Mr. George Humphreys) through illness, and said that he had seen Mr. Humphreys lately, and he hoped soon to be recovered. Mr. G. Wilkins proposed that Mr. E. Walters be elected President for the ensuing year. Mr. W. Church seconded this, and it was carried. Mr. Walters acknowledged the compliment, and said he would endeavour to do all he could for the trade and the Association. On the motion of Mr. Krauss, seconded by Mr. F. N. Cowlin, and supported by Mr. Scull, Mr. George Wilkins was elected vice-president. Mr. Wilkins returned thanks for his election. Mr. W. Church proposed that the following be elected members of the committee :—Messrs. E. I. Neale, J. Lovell, F. N. Cowlin, F. A. R. Woodward, A. Dowling, J. Eastabrook, C. A. Hayes, and W. K. Thomas. Mr. Krauss seconded the resolution. On the motion of the Chairman, seconded by Mr. Dowling, Mr. G. Humphreys was elected treasurer. Mr. Neale then proposed a vote of thanks to Mr. Walters for his services. This was carried; and subsequently, on the motion of the Chairman, seconded by Mr. Thomas, thanks were voted to the retiring president.

WHITE HART HOTEL, OXFORD.—The architects for this building, mentioned in our last, write to say that it is by Messrs. Davy & Salter, not Mr. Stephen Salter, as given in our paragraph.

DISCOVERY OF A ROMAN VILLA AT ROTHLEY, LEICESTERSHIRE.—While engaged in excavations close to the railway-cutting at Rothley Station for the purposes of road-making, the workmen have unearthed some remains of what promises to be a Roman villa. The discovery was made close to the spot where Roman remains were found when the water main at Rothley was being laid some time since. At that time some portions of a Roman pavement were dug up, together with other valuable finds, including a piece of red Samian ware, and also the beautiful fibulæ, which is now in the Leicester Museum. Several other valuable relics were discovered in the vicinity, and pieces of bone were taken up in one place where there were said to be several graves. These relics excited considerable interest at the time, and it was suggested that proper excavations should be made. This was not done, however, and nothing more occurred until the discovery a few days ago of the foundations of a villa revived interest in the matter. While working, one of the workmen struck his pick against some hard substance, which proved on further examination to be a concrete floor of great age. After this the greatest care was used, and continuing their efforts, a whole room was laid bare. The floor was surrounded by the remains of walls about 2 ft. in height from the base. These were constructed of rough granite, filled with concrete. The granite had evidently been covered with plaster. The part uncovered would appear to be the heating-room of an extensive villa, judging by the flues which were found close to the spot when the water main referred to was laid. Near here were discovered some roofing tiles, a few pieces of bone, and a piece of a mortar, apparently used for pounding food, perhaps grain, &c. The mortar was of pottery ware, the inside being lined with small flints pressed into the clay before baking. There appears to have been a very extensive villa at this place, but, unfortunately, the greater part of it seems to lie under the new road. As far as it has been uncovered, it can be seen that the foundations arein perfect condition. The concrete floor of the room is intact, and from this spring a number of small pillars, the bases of which remain. Among the things found there is a piece of red Samian ware, which appears to have been the spout of a Roman lamp. The discovery of this portion of the villa is of the highest interest, as it shows the extent of the Roman occupation of Leicestershire. The work will be proceeded with, and it is hoped to unearth the whole of the villa.—*Leicester Post.*

THE SANITARY INSTITUTE.—At an examination in Practical Sanitary Science, held at Bristol, on January 25 and 26, three candidates presented themselves, and the following two candidates were awarded certificates :—W. S. Bracher and W. O. Thorp.

FITZGEORGE-AVENUE, HAMMERSMITH-ROAD.—On January 16, the Lord Mayor, attended by some of his suite, opened a new thoroughfare which has been made from North End-road to a point near the south side of St. Paul's School. The street, which is 50 ft. wide and about 400 yards long, was built by Mr. Henry Lovatt, after Mr. Delissa Joseph's designs and plans. On each side of the road are blocks of residential flats, some of which are already taken or ready for occupation. The blocks differ from one another in respect of their planning and design, so as not to present a prolonged repetition of the same elevation.

EDINBURGH BUILDING TRADES EXCHANGE.—The second annual dinner of the Edinburgh Building Trades Exchange took place on the 17th ult., in the Royal British Hotel, Princes-street, Treasurer Graham Yooll (Leith) presiding over a company of about seventy gentlemen. After the usual loyal toasts had been honoured, Councillor Forrest proposed "Kindred Associations." In replying, Colonel Bennet said he had no doubt they were feeling with the Glasgow Exchange that the members did not take that interest in the Exchange they ought to do. The Exchange was made and thought of for the good of the trades they were connected with, from the very root of the tree to the very top. They wanted the Exchange, beginning with the architect, to take in the builder, the constructor, the finisher—every one connected with the trade. They desired that they should all be united in the Exchange. Colonel Bennet further counselled them to keep abreast of the times in their various lines of business. Other countries were making vast strides; they must make a point of seeing they were not left behind in the race. Mr. J. C. Hamilton proposed the "Imperial Forces." Captain Moscrip replied. Mr. A. P. Laurie gave the toast of the "Magistrates and Town Councils of Edinburgh and Leith." Councillor Pollard and Bailie Kinnaird replied. The former remarked that the relations of the Town Council of Edinburgh with the building trade and building interests were of a very satisfactory kind and the Council were only doing their duty if they were trying to make that satisfactory condition of things a matter of long continuance. Bailie Kinnaird, in replying, scouted the idea of amalgamation or union with Edinburgh. Leith, he said, had made greater strides in the direction of improvement than any other town in Scotland. He hoped they would soon have better tramway communication between Edinburgh and Leith. Mr. John Robertson having proposed "The Edinburgh Building Trades Exchange," the Chairman responded. It had taken a great number of years, he said, to make the Exchange what it was at present, although it had only been constituted for the last three years as the Building Trades Exchange. He earnestly pleaded for further support to the Exchange, which was endeavouring to extend its sphere of usefulness.

PETERHEAD MASTER BUILDERS' ASSOCIATION.—The annual supper of Peterhead Master Builders' Association was held on the 16th ult. in the Palace Hotel. Mr. Alexander Webster, builder, presided, and Mr. Alexander Milne, engineer, was croupier. The Chairman, having proposed the loyal and patriotic toasts, gave a resume of the work done by the Master Builders' Association since its inauguration, which he said was due to the efforts of Messrs. W. Hadden, builder, and J. Davidson, plumber. Treasurer Martin proposed the "Architectural Profession." Mr. William Stuart, architect, responded. Mr. A. Scott, builder, proposed "The Public Boards." Bailie Wilson, in acknowledging, said the only burning question before the Town Council at present was the erection of an hospital, which they would be compelled to build whether they wanted to or not. Mr. W. Kennedy, quarry manager, Cruden, proposed "The Town and Trade." Councillor Ritchie responded. Other toasts followed.

NOTTING HILL ELECTRIC LIGHTING SCHEME.—At a meeting of the Kensington Borough Council recently, the Notting Hill electric lighting scheme was discussed. Under this scheme one of the electric supply companies seeks powers to acquire sites in Napier-road and Holland-mews, Kensington, for the erection of works for generating or distributing electricity. The Law and General Purposes Committee were of opinion, considering the residential character of the district in which the selected sites were situated, that the scheme should be opposed by the Borough Council, unless the promoters would agree to the insertion of clauses in the Bill whereby the sites in question would not be used for generating stations, but be restricted to the purpose of storage and transferring stations. The Council decided to address a letter to the promoters intimating that, unless they were prepared to consent to the insertion of clauses as above, the Bill would be opposed by the Council.

WOOD-CUTTING MACHINERY.—Messrs. Glover & Co., of Leeds, whose circular-saw guard was described and illustrated in our issue of August 25, 1900, have patented a machine for cutting up old and waste wood which may be saleable or useful for various purposes at a profit which cannot be ensured by the slower and more expensive process of labour. Their machine, in fact, deals with the whole process of cutting up wood, from the original tree to the bundle of sticks. They state also that as very large knots can be split by their machine, knotty waste wood can be turned into the finest firewood, which cannot be so utilised or dealt with by hand.

## *CAPITAL AND LABOUR.*

NORTHERN BUILDING TRADE DISPUTE. — At Leeds, on the 23rd ult., a conference was held between the Executive of the Northern Centre of the Building Federation and representatives of the London Order of Bricklayers in reference to the dispute at Newcastle. It is stated that the principle of arbitration was accepted by the men, but the conference closed without any understanding as to the arbitrator and the basis of arbitration being arrived at. A general lock-out in Yorkshire, Lancashire, and Cheshire is threatened unless the men furnish a definite reply on the points mentioned.——A general meeting of the members of the Newcastle, Gateshead, and Tyne District Master Builders' Association was held at the Building Trades Exchange, Newcastle, on the 29th ult. As the reply to the terms of arbitration offered by the Northern Centre of the Builders' Association to the operative bricklayers was not considered satisfactory, no decision was come to by the meeting. It is stated that the lock-out will now extend to Lancashire, Yorkshire, Cheshire, and the Isle of Man on February 2.

## *LEGAL.*

### IMPORTANT POINTS UNDER THE PUBLIC HEALTH ACT, 1875.

THE cases of the Mayor, &c., of Southend-on-Sea, *v.* Archer; and the same *v.* Romanis, came before a Divisional Court of King's Bench, composed of Justices Bruce and Phillimore on the the 25th ult. on two appeals by the town clerk of Southend from the decision of the justices of Southend dismissing informations preferred by him against both respondents for alleged contraventions of the by-laws in force within the borough with respect to new streets and buildings.

In the first case Archer was charged with unlawfully erecting a new building, viz., a weighing machine house, without causing such building to be enclosed with walls constructed of good bricks, stone or other hard and incombustible materials, in alleged contravention of No. 11 of the by-laws of the borough. With regard to this case the material facts were these:—The structure in question was a house or shelter of a weighing-machine on the western esplanade where the public passed and stopped for the purpose of using the machine. The erection was made in sections and could be easily moved and was only used in the summer. It measured 10 ft. 4 in. by 7 ft. (exclusive of projecting steps, 1 ft. 8 in. wide), with a height of 10 ft. in front and 8 ft. 6 in. at the rear. It consisted of wood framing, closely boarded with match-boarding on all four sides. It had an opening 7 ft. wide in front, open during business hours, but closed at night with wooden shutters and bolted. There was also a door on the east side which was locked at night. It had a wooden floor closely boarded and placed on sleepers or joists, the roof being constructed of wood, covered with felt. Inside was the machine, a table, two chairs, and some hat-pegs. The structure was not fixed to the soil, the only foundation being the wooden floor joists resting in the ground. There were no sanitary arrangements, and no provision for artificial lighting or heating. The structure was always closed at night, and no person remained on the premises. The appellant contended that the object of making by-laws under the Public Health Act, 1875, was to prevent the erection of wooden buildings or buildings of combustible materials in unfit situations, and that the structure in question was not an "exempted" building, and that it was a new building within the meaning of the by-laws. The respondent Archer contended that the structure was not a building or new building within the by-laws at all, and the justices upheld his contention and dismissed the information. The question for the Court now was whether the justices were right.

In the second case the structure in question was erected by the respondent Romanis on land in the borough on the sea front for the purpose of being used in the summer months for the sale of light refreshments. It was erected at the beginning of each season and taken down at the end, it being built in sections for the purpose. It measured 9 ft. 3 in. by 6 ft. 11 in., with a height of 7 ft. 5 in. It consisted of wood framing closely boarded with ½-inch match-boarding on all four sides. The front was movable and was taken down during business hours and closed and locked at night. It had a wooden floor and a roof of canvas fixed on wooden cross-pieces and fastened down all round. Inside there was shelving and a counter, and goods on the shelves. There were no sanitary or drainage arrangements and no provision for artificial lighting or heating except an utensil for making hot water. The structure rested on the ground by its weight without being fixed to the soil, and had no foundation or chimney. The place was used as a shop for the sale of mineral-waters, tea, and so on, during the summer months, a person being employed there to serve customers. At night it was locked up, but nobody remained on the premises. The justices also held that this erection was not a new building within the meaning of the by-laws, and dismissed the information. The question also for the Court now was whether they were right in so holding.

Mr. Macmorran, K.C., and Mr. Herbert Smith appeared in support of the appeal. The respondents were not represented.

At the conclusion of the arguments of counsel, their lordships came to the conclusion that neither of the erections was a building within the Public Health Act, 1875, and the by-laws made thereunder, and dismissed both appeals.

### RESPONSIBILITY FOR DRAINAGE WORK.

AT the Clerkenwell County Court a few days ago, before his Honour, Judge Edge, judgment in the case of H. L. Markham, clerk, Leigh-court, Muswell Avenue, Muswell Hill, N., *v.* Charles W. Rook, builder, Muswell Avenue, Muswell Hill, was delivered. Judgment had been reserved, the plaintiff claiming 8*l.* 13s. 6d., moneys paid by him to the Vestry of St. James and St. John, Clerkenwell, in respect of sewers, which moneys were payable by the defendant. The latter entered a counter-claim for 12*l.* 15s. 2d. for fittings supplied and work done for the plaintiff.

Mr. Davis was counsel for the plaintiff, and Mr. Gervans for the defendant.

The judge now reviewed the facts of the action, and said, as a matter of equity, no doubt the plaintiff would have to pay the outgoings from the time that he obtained possession, and the defendant would have to pay them up to the time that he gave possession to the plaintiff. It turned out that the plaintiff purchased the house on the representation made by the defendant, and he probably would not have purchased had he known that the paving and sewering were not paid for. His first impression was that the plaintiff could recover, and that it was a misrepresentation on which the contract was based. But upon the perusal of the cases which had been cited to him, he had come to the opposite conclusion. He was quite clear that there was no fraud on the part of the defendant. The sewer had been put in some two years before the contract of sale was made, and no demand whatever of any kind had been made upon the defendant in relation to it. The case in question broadly laid it down that, although there was a contract in writing and a representation of certain things existing at the date of the contract, and it turned out afterwards that they did not exist, if the purchase was completed before any action was taken there was no remedy. The verdict would, therefore, be for the defendant, with costs on the claim, and for 6*l.* 4s. 6d. on the counter-claim, without costs.

### "TUBE TREMORS."

MR. J. W. PENFOLD, F.S.I., sat as arbitrator, on the 29th ult., at the Surveyors' Institution in respect to a claim against the Central London Railway Company for injury done to No. 2, Lancaster-gate. The claimants were Lord Herschell and Mr. A. W. M. Baillie, acting as executors under the will of the late Mrs. Mary Cunliffe.

Mr. C. A. Cripps, K.C., who appeared for the claimants, said that in consequence, it was believed, of the construction of the Central London Railway serious cracks began to appear at 2, Lancaster-gate, and there were indications that a serious subsidence was taking place. Owing to these disturbances, the tenant, Mrs. Hawkins, left, and the house now remained unoccupied. The owners claimed damages to the amount of 1,600*l.*

Mr. E. R. Robson, F.R.I.B.A., said he had inspected the house on May 17, 1899, and found a number of cracks in the walls and ceilings. They seemed to him to be caused by a general disturbance of the foundations, due, he should think, to the construction of the railway.

Mr. J. Bott, house agent, described the damage as seen by him on several recent visits. The first house, No. 1, which was nearer the line of the railway, showed even greater damage, and steel girders had had to be introduced into the hall. The cracks he imagined to have been caused by the construction of the railway, and now that the trains were working, the damaged houses were less able to stand the vibration.

Mr. Mark Judge, A.R.I.B.A., stated that he had inspected the house in June last year, and was of opinion that the damage was caused by the railway.

Mr. Freeman, for the defence, said this was the first practical claim for damage brought against the company, and they were prepared to submit a large body of evidence to back up the defence. It was impossible from an engineering point of view that the damage could have been caused by the construction of the railway, which was 64 ft. below the surface of the road. The house, which was forty years old, had been built on the remains of a water-brook, and there still remained a large deposit of mud, with an unstable substratum. Moreover, the bursting of a water-main in 1897 had undermined the foundations, and it was quite possible that this was the cause of the damage.

The hearing was adjourned provisionally until February 8.

### THE CENTRAL LONDON RAILWAY.

AT the London Sheriff's Court, on Wednesday, before Mr. Under Sheriff Burchell and a special jury, the case of Purvis *v.* the Central London Railway Company came on for the assessment of damages. The claim was for 4,200*l.*

The case for the plaintiff, Dr. W. Laidlaw Purvis, of 20, Stratford-place, Oxford-street, was that his house, of which he held a perpetual lease from the City Corporation, had been damaged by the construction of the Central London Railway, the ground having subsided, thereby causing cracks in the outer walls. Expert evidence was called to prove that it would cost 2,294*l.* to carry out repairs, including the underpinning of the house, while 500*l.* was claimed for the depreciated value of the house, and 479*l.* for loss by reason of the tenants of the top and bottom floors having to leave while the repairs were executed. Dr. Purvis also claimed 1,000*l.* for inconvenience, damages to his practice as a consulting physician, consequent on his having to take other premises for a time, and for other incidental expenses. Witnesses stated that the work would take nine months to do.

For the defendants, expert witnesses stated that the necessary work could be done for 574*l.*, and that the time occupied would not be more than fourteen weeks. The defendant company were willing to pay 1,120*l.*

In the result the jury awarded the plaintiff 1,500*l.*, and judgment for this amount was entered.

### ACTION BY AN ARCHITECT.

THE case of Green *v.* John Mason & Sons came before Mr. Justice Channell and a common jury in the King's Bench Division on the 29th and 30th ults.

Mr. Marshall Hall, K.C., and Mr. Foa appeared as counsel for the plaintiff; and Mr. Duke, K.C., and Mr. Moyses for the defendants.

Mr. Foa, in opening the case, said this was an action by an architect and surveyor (of 10, Warwick-court, W.C.), who claimed the sum of 180*l.* from the defendants, who, he alleged, employed him in two capacities, first as architect in drawing and supervising the plans for the erection of certain buildings, and also as agent acting for them in selecting the site necessary for the purpose of buildings which the defendants intended to have erected. The larger portion of the sum claimed, viz., four-fifths of the whole sum due, the plaintiff claimed in his capacity as architect. The defendants were brushmakers at Clerkenwell. Like a great many other firms who carried on business in large premises, they found it convenient to go into the country—that was to say, into a place which was not so crowded a district as Clerkenwell, but not too far from London. The defendants throughout these transactions were represented by a firm of soicitors. At the time the story opened the solicitor was a Mr. Cowley, and this gentleman played an important part in the case. He shared chambers in Gray's Inn with the plaintiff, and knowing that the defendants wished to erect a factory, he placed the matter before Mr. Green. In March, 1899, Mr. Cowley told the plaintiff what the business was, and two days later Mr. Cowley, Mr. Mason, and the plaintiff had an interview. Mr. Mason then gave the plaintiff definite instructions to do certain preliminary drawings. An arrangement was also made that the plaintiff should go to the defendants' factory in Clerkenwell in order to study the requirements of Messrs. Mason. On April 6 the plaintiff, one of the defendants, and Mr. Cowley went to Willesden. The plaintiff, when he was first approached by Mr. Cowley, informed him that he thought he knew of some land which would just about suit the requirements of Messrs. Mason. A few days afterwards the plaintiff, having obtained from the vendor the price of the site, received definite instructions from defendants, through Mr. Cowley, to negotiate with the vendor for the sale of the land. Mr. Green offered, under the instructions of Mr. Cowley, 650*l.* in the first instance. That offer was refused by the vendor, but after further negotiation Mr. Green, under the instructions of Mr. Mason, offered 750*l.*, and this offer was accepted by the vendor. Unfortunately, the vendor's solicitors were unable to put the thing through. The chief difficulty was this. At the present time, before a building could be put up in the London district, it was necessary to get a licence from the London County Council. The London County Council refused this licence until a certain bridge which spanned a canal in that neighbourhood had been widened. The bridge did not belong to the vendors but to the canal company, and the company refused to have the bridge widened. This

difficulty was never got over. To put the matter very shortly, after the amended offer had been made and accepted Mr. Green and the defendants thought the thing would go through, and Mr. Green was asked by the defendants to go on with his plans. Those were the amended plans, because the first plans were abandoned. In the autumn of 1899 the defendants were getting a little tired and pressed the plaintiff to get them a site somewhere else. The plaintiff undertook several journeys in the neighbourhood of London—Harrow, Finchley, and other places—but at the same time the defendants did not like to give up this site at Willesden, which they thought the most convenient for their requirements. In December matters had so far progressed that the plaintiff received definite instructions from the defendants to prepare the specifications. This was a very lengthy document. At the beginning of January last year, the defendants, finding that the site they would have liked to have presented so many difficulties, were advised to take a site on the same land at the other side of the bridge. The price of this site was 1,000*l.*, and defendants bought the land for that sum, and amended plans were prepared by the plaintiff on the instructions of the defendants. At the end of January, 1900, these plans were submitted to the defendants by the plaintiff. On January 31 the plaintiff received instructions from Mr. Mason to complete the plans in accordance with the amendments made by the latter, and to get out an estimate of the cost. It turned out afterwards that the defendants were not able to acquire that site. In February, 1900, a dispute of a serious kind broke out between Mr. Hanna (Mr. Cowley's partner) and Mr. Green, but with reference to matters not germane to the transactions in question. Mr. Green was told that he must settle the matter within seven days or it must be considered to be at an end. Mr. Green at this time had done all the work he was employed to do. Mr. Green then sent in his account to Messrs. Mason for services rendered. Messrs. Cowley & Hanna, on behalf of the defendants, denied liability to pay the account as rendered, stating that it was a condition that in the event of the plaintiff failing to negotiate for the sale of the land to the defendants, he should only charge the defendants with out-of-pocket expenses and disbursements and a merely nominal charge for his services. The plaintiff would tell them that he never made any such arrangement as that. The defence set up by the defendants was this. They said that although it was true plaintiff had done work for them, and that they had employed him as their architect, his being paid for his work was subject to the condition that the land should be acquired by defendants, and that as the land was not acquired that was sufficient to disentitle the plaintiff to charge anything except out-of-pocket expenses. The plaintiff denied this, and, said the learned counsel, it was extremely improbable that any architect would agree to any such thing. In conclusion, he stated that the plaintiff was suing on a *quantum meruit*. The plaintiff had to make out that his charges were fair and reasonable. Those charges were according to the scale as recognised by the Royal Institute of British Architects. The plans which the plaintiff had prepared were made under the direction of the defendants. Evidence would be called to prove that with slight adaptation the plans could be used on any site.

The plaintiff was then called, and gave evidence generally bearing out counsel's statement.

Cross-examined by Mr. Duke: He was a land agent, surveyor, and architect. He had ascertained particulars of the land at Willesden before he came into communication with the defendants. He made an agreement with Messrs. Roebottom, the agents for the vendors, that if he was able to dispose of the land he should share half of their 5 per cent. commission. He did not seek at any time to obtain anything in the nature of a double commission. He was an architect and surveyor.

Are you an architect? Yes.

Whom were you articled to?—I was articled for three years to a Mr. Richardson, and afterwards to a Mr. Allen, who was a Fellow of the Royal Institute of British Architects.

Did you make the plans in this case?—Not the actual plans submitted to Mason's. I assisted in making them. I did not actually prepare them.

The witness, in further cross-examination, said, he did not draw all the specification but about one-half of it. Mr. Goss prepared the plans and the specification, but under the witness' supervision. Goss was paid 15*l.* 15s. for the plans and 3*l.* 3s. for preparing the specification. It was true that he asked the defendants to pay 160*l.* for the plans and specifications, but this sum included survey fees, interviews and correspondence, which was very voluminous.

Mr. Mason, when he saw the drawing which the witness had prepared, had not said witness was going to unnecessary expense and that if they (defendants) did not get the land they would not want the drawings. His instructions were to prepare plans of certain departments at certain dimensions. On June 8, 1899, there was a risk whether they would get the site at all. The matter was out of his hands so far as the contract was concerned. He could not say whether that was about the date when he put the matter into the hands of Goss to prepare plans, for which he afterwards paid Goss 15*l.* 15s. He had known of architects preparing plans of buildings without taking the levels of the site, or the correct measurement of the sites. He had never personally erected a factory, but he had been concerned during his articles in the erection of a number of warehouses.

Is it not a matter of common-sense that before you prepare plans for the erection of buildings you must find out what your levels will be?—It depends entirely upon the land. I took upon myself as the architect the full responsibility for the erection of the factory. The witness further stated that negotiations between Messrs. Mason and himself came absolutely to an end at the end of April. On April 28, witness told Goss to get on with the specification in order that the witness could complete his own specification. He subsequently received the specification from Goss. That work formed part of the work for which he claimed payment from the defendants.

Mr. F. R. Farrow, examined by Mr. Fox, said he was an architect and an F.R.I.B.A. If an architect prepared plans and specifications, it was in accordance with custom that he should be entitled to a certain fee on the estimated cost of the building. If the proposed building was not proceeded with the architect would be entitled to charge for the preparation of the plans and specification 2½ per cent. on the estimated cost of the building. This was in accordance with the rules of the Institute of British Architects. He had seen the specification and drawing in the present case. From these he considered that to erect a building as proposed would cost at least 6,400*l.*; 2½ per cent. on that would work out at 160*l.* It was not unusual for architects to employ another architect to prepare plans and specification, the latter being paid a fixed sum for doing the work.

Cross-examined.

It was very usual for busy architects to do this, but not for young architects just commencing business. He had never heard of Mr. Allen or Mr. Richardson, to whom Mr. Green said he had been articled. He knew a Mr. Richardson, an auctioneer and surveyor, who lived at Finchley.

Other evidence having been given,

Mr. Duke, in opening the defendants' case, said that the plaintiff was told when defendants' commenced negotiating with him, that all they could afford to spend on the erection of a factory to include the price of the land, was 5,000*l.* No doubt Masons would have allowed Mr. Green to draw the plans when the matter was ripe for that to be done, but their case was that that never happened. The defendants' told Mr. Green that he must understand they did not intend to incur expense in the matter, and that they would not lay out more than 5,000*l.*, and that it was no good his going to expense until they were certain they were going to get the site. In answer to Mr. Mason, the plaintiff had said, "Oh, that is all right; these are only rough drawings, and if the site is not got it will not be any cost to you worth speaking about."

Mr. Arthur Mason, a member of the defendant firm, examined by Mr. Duke, said he had asked Mr. Green for a rough idea of the cost of the building, so that they might adapt it to their requirements. He told him they could not possibly exceed 5,000*l.* for the whole amount, including the land. Plaintiff said he could easily keep it down to that sum. In April plaintiff showed him a rough drawing by a Mr. Smith. Witness told him that it was different from what he wanted, and to run to no expense. Green replied that they were merely rough drawings in order to get at the cost of the building, but that they would cost nothing for professional services. Witness was subsequently shown plans drawn by Goss. Witness then said they were more like what they required, but inasmuch as the question of acquiring the site was hanging fire, he hoped he would incur no expense. Green assured him that no expense would be incurred until the site was acquired. There was no truth in the suggestion that the matter was withdrawn from the plaintiff because of his quarrel with Mr. Hanna.

Cross-examined by Mr. Fox.

They had not paid the plaintiff anything. Witness had received Mr. Green's amended plans and kept them and studied them—at least the ground plan. He did not believe that his solicitor had instructed Mr. Green to get out a specification.

His lordship said it was plain from the correspondence that that was only intended to be done when the land was got.

Cross-examination continued.

He agreed generally that the price of the land should not exceed 1,000*l.*

Mr. Hanna, examined by Mr. Duke, said he was a solicitor, one of the firm of the defendant's solicitors. He never told Mr. Green anything about getting out the specification. The thing never came to such a stage that a specification became necessary. Mr. Green was distinctly told that it was not necessary until the land was obtained.

Cross-examined by Mr. Fox.

He had heard that a fresh site had been selected and the offer of 750*l.* increased to 1,000*l.* He had nothing to do with that personally.

Mr. Cowley, a member of the firm of solicitors representing the defendants, examined, said the plaintiff was told that the building, including cost of land, should not exceed 5,000*l.*—Plaintiff said it could easily be kept down to that. Witness told Green repeatedly that it was no good going on with the plans until they had secured the land. He had never given Green specific instructions to prepare plans and specifications.

Mr. P. D. Smith, an architect, late student of the Royal Academy, Silver Medallist of the Royal Institute of British Architects, and Travelling Student of the Architectural Association, examined, said he had known plaintiff twenty years, but did not consider him an architect. He had prepared the plans mentioned, but had not yet been paid by Mr. Green anything for doing them.

Cross-examined: He had cut Mr. Green's acquaintance in everything since that job.

Mr. Sidney George Goss, examined, said he was the gentleman who had prepared the plans produced. He was an A.R.I.B.A. Mr. Green was not an architect. Witness agreed to take a small fee because the plaintiff had told him that it was purely speculative work on his part. The plans were not sufficiently completed to enable a builder to build a factory from them. Witness could not complete them until the site was selected. The plans could not be carried out for less than 8,000*l.* or 9,000*l.*, and so he told Mr. Green when he took him the sketch plans.

Cross-examined by Mr. Fox:

So long as Messrs. Masons obtained a site large enough, they could use the plans in question if they were amended. When an architect did such work as this for another architect, it was technically known in the profession as "taking in washing."

Other evidence having been given, the jury in the result returned a verdict for the plaintiff for 25*l.*, but inasmuch as the defendants had paid the amount into court in satisfaction of the plaintiff's claim, judgment was entered for the defendants with costs.

## RECENT PATENTS:

### ABSTRACTS OF PATENTED INVENTIONS.

19,720.—KEYS FOR LOCKS: *V. Dugmore.*—The tail, which is made separately from the bolt-head, is fastened within a recess cut in the head. In the bolt is a hole through which passes a stump that is also made upon a separate piece, of which the tail is slotted so that it may ride upon the fixed stump.

19,722.—BLOCKS FOR USE IN THE CONSTRUCTION OF CONDUITS, ARCHES, WELLS, SEWERS, &c.: *D. T. Clegg & H. N. Brooke.*—The vitrified blocks are hollow, and are shaped with dovetailed or under-cut grooves in their sides and outer faces, which will take cement. The blocks are also fashioned with interlocking end spigots and sockets.

19,756.—A MACHINE FOR SURFACING AND POLISHING MARBLE, GLASS, PORCELAIN, &C.: *D. Gilles.*—The machine for surfacing and polishing glass, marble, metal, and other plates is fitted with discs placed horizontally and forming two sets, each of which comprises a grinding-stone, an emery or some similar disc, and a buffing disc; the composite discs are mounted above the rails upon which the work-table is moved. The two sides of the plates are ground by the two sets of discs respectively. The discs can be adjusted vertically by means of a screw gear that secures them to their spindles. The rails can be similarly adjusted, and grinding-blocks may be substituted for the discs. The contrivance is described as being applicable for use with the frames of other glass-grinding machines, and for the grinding of lenses beneath stones faced to the necessary curvature, the lenses being held stationary the while.

19,781.—ELECTRICAL SWITCHES: *S. A. Hunter.*—For tumbler-switches one of the two projecting pieces upon the base separates the contacts and carries a support upon which the tumbler lever is mounted, to the other projecting piece is pivotted the movable contact-lever which has an insulated cross-bar and a connecting cross-piece; the cross-bar is pressed by the lever, which is so shaped that the contact-lever shall move quickly at first but more slowly afterwards; a quick break is effected by means of a spring, and a loop gives a positive movement.

19,813-4. — RADIATORS FOR THE HEATING OF BUILDINGS: *F. A. Wilmot.*—For hot-water or steam-heating apparatus a wrought-metal radiator consists of pipes that are fitted into "headers" formed of sheet metal fashioned into shape, flanged sleeves, having inner sleeves and being bolted together, join the sections, which may be several in number, to one another. From the end of the radiator section projects a second flanged sleeve in which the steam or hot-water supply pipe is screwed. (19,814.) The radiator-pipes are secured in "headers" cupped and drawn from wrought metal, the edges of the blank in each case being closed in and fastened upon the "header's" outer face, whilst openings with collars are fashioned in the inner face to which the pipes are secured—confer No. 6,824 of 1897. The collars may either extend downwards or extend upwards, and so take the pipes around or within them.

19,861.—CONTROLLING VALVES FOR DOMESTIC SERVICE-PIPES: *L. B. Smith and E. A. Gilbert.*—A partition in which is an aperture controlled with a valve divides a cylinder into two parts; a valve and stem are mounted in a piston attached to the lower end of a hollow sliding tube, on to which the

former valve is fixed; when the latter valve is removed from its seat with a spring push-rod, the piston is forced downwards by the excess of pressure upon its upper side, and the flush thereupon is admitted through the valve in the dividing partition, but the piston will be raised again as the excess of pressure becomes transferred to act from underneath it by the closing of the push-rod valve, which is effected by means of the impact of an extension at the end of the rod against the bottom of the lower division of the cylinder.

19,881.—ROUGHENING OF GLASS SURFACES: *A. F. Davis.*—For roughening the surface of a finished sheet of glass in order that it may be cemented to walls, &c. The glass sheet is blown into the shape of a cylinder, and then split lengthwise. After being re-heated and flattened out, the inside of the split cylinder is coated with a composition of minium, silica, and calcium phosphate mixed with water, varnish, or oil, applied with a brush, and roughened with a grainer's tool.

19,921.—FACING-SLABS FOR BUILDERS' USE: *F. Bassett, trading as Bassett's Plaster Company.*—The invention applies to the making of slabs for facing walls, partitions, ceilings, and so on. They are composed of pierced strips of scrap or waste metal, to be obtained from chain-making and similar works, which are embedded in a mass of coarse adamant plaster poured into a mould. When they have been nailed on to the wall or ceiling they can be plastered, painted, and decorated.

19,955.—A TAP FOR MIXING HOT AND COLD WATER SUPPLY: *M. F. Adams.*—In a combined hot and cold-water supply tap a screw-down valve regulates the outlet from a chamber of the casing, which is divided accordingly, the cold water supply pipe being connected with that chamber. An extension downwards of the spindle of the screw-down valve operates a lever which is pivotted beneath it, and is set in engagement with the spindle of a self-closing valve, by means of which the hot-water supply is furnished and regulated. The arrangement provides that hot water only shall flow from the tap when the screw-down valve has been depressed so that it bears against its lower seating and thereby cuts off the supply of cold water.

19,956.—WRENCHES: *A. A. Peart.*—A cam which is placed so as to press against the stem of the wrench and is formed upon the end of a handle which is pivotted to the movable jaw, serves to retain that jaw in a fixed position upon the stem. For an increase of the grip both the cam and that portion of the stem against which it bears should be toothed.

19,973.—A COWL FOR CHIMNEYS; *W. Whitehead, T. Harris, and H. C. Sacré.*—Gimbals or a Hooke's joint within a cup containing oil carry a cone-shaped cowl above the uptake of the chimney. In the case of an ordinary chimney-pot a bridge upon a short pipe fitted into the pot is employed as a mounting for the oil cup, and the cowl may have radially-curved vanes for its turning by the wind, the cowl being placed above a spindle of an archimedean extractor set within an uptake made of metal. In that form an india-rubber buffer ring is placed around the pipe at a level lower than that of the oil cup, and a conical baffle-ring is placed around the uptake just below its mouth.

20,004. — FLEXIBLE METALLIC TUBING: *C. Rudolph.*—The ends of the tubing, which is after the kind specified in No. 9,478 of 1885, have protecting and bent pieces to be brazed, soldered, or welded together, or they may be thickened by means of rolled strips in such a manner that, whilst the thicker ends are left, the middle part becomes thinned; the tubing is composed of the ends of channelled metallic strips which are wound around in the manner of a helix.

20,028.—GAUGES: *H. Brooker and A. F. Baxter.*—A toothed disc which works within a casing is set in gear with the threads of a spindle, various gauge-scales of known kinds, with a decimal scale for plates and wires, are marked upon the disc, and there is provided a vernier-scale for very fine adjustments; the scales can be read through openings cut through the casing; in some instances the disc may be advantageously replaced with a travelling rack-bar.

20,038.—FEED-WATER APPARATUS: *T. F. Whitney.*—Upon the main boiler is mounted a supplementary boiler, wherein the supply of hot water is kept up by the admission of exhaust steam. Inside the auxiliary boiler is placed a feed-heating chamber, into which water enters through a five-way disc or plug-valve. The reversal of the valve arrests the flow of the feed-water, and the heater is thereupon brought into communication with the boiler, both above and below the water-level, by means of pipes, the water flowing through its own gravity into the boiler. A spindle and a cross-arm in engagement with notches work the spindle.

20,048.—MANUFACTURE OF ACETYLENE: *H. F. Rogers.*—A hanging pocket, having a cover, is fitted within an ordinary gas-holder bell, the carbide is laid upon trays disposed in the pocket, and the supply of water is regulated by a cock of which the handle can be moved over the face of a dial affixed outside the bell; the resultant gas flows through a cock so as to lift up the bell and at the same time to cut off the water supply. The cock can be turned from without the bell; the position of a ratchet wheel, which is engaged by a pawl upon the gas-holder, will indicate when the top tray of carbide has been exhausted, then the two cocks are turned off and the trays can be re-charged whilst a supply of gas remains in the holder; a coil and pipe are provided for the flow of the gas into a purifier charged with oxide of iron or lime, or with lime and oxide of iron together.

## MEETINGS.

FRIDAY, FEBRUARY 1.

*Sanitary Institute (Lectures for Sanitary Officers).*—Dr. E. J. Steegmann on "Mechanical Physics, Laws of Motion, Hydraulics, &c." 7 p.m.

*Royal Institution.*—The Rt. Rev. Monsignor G. Molloy, D.Sc., on "Electric Waves." 9 p.m.

*Architectural Association of Ireland (Technical Demonstrations).*—Mr. B. A. Phillipson on Electricity, &c. (at 10, Lower Baggot-street). 4.30 p.m.

SATURDAY, FEBRUARY 2.

*British Institute of Certified Carpenters.*—Monthly meeting, Carpenters' Hall. 6 p.m.

MONDAY, FEBRUARY 4.

*Royal Academy.*—Professor Aitchison, R.A., on "St. Peter's." III. 4 p.m.

*Society of Arts (Cantor Lectures).*—Mr. J. Liberty Tadd on "Elementary Art Education." IV. 8 p.m.

*Society of Engineers.*—The President for the past year, Mr. Henry O'Connor, will present the premiums awarded for papers read during the year. 2. The President for the year 1901, Mr. Charles Mason, will deliver his inaugural address. 7.30 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Dr. E. J. Steegmann on "Natural Forces: Light, Heat, Electricity, and Chemistry." 8 p.m.

*Leeds and Yorkshire Architectural Society.*—Mr. F. Rowntree on "Domestic Work." 6.30 p.m.

*Liverpool Architectural Society.*—1. Election of members and the election of a joint honorary secretary in place of Mr. F. E. P. Edwards, resigned. The council nominate Mr. G. Hastwell Grayson, M.A., A.R.I.B.A. 2. To consider and approve a draft memorandum and articles of association in connexion with the proposed incorporation of the society, which has been prepared by the council in accordance with the resolution passed at the last annual general meeting. 6 p.m.

TUESDAY, FEBRUARY 5.

*Royal Institution.*—Professor J. A. Ewing, M.A., F.R.S., on "Practical Mechanics (experimentally treated): First Principles and Modern Illustrations." IV. 3 p.m.

*Institution of Junior Engineers.*—Mr. A. H. Barker, B.A., B.Sc., on "Works Management." I. 8 p.m. (at Westminster Palace Hotel, Victoria-st., S.W.).

*Royal Photographic Society.*—Mr. Ernest Marriage on "Romanesque Architecture." Illustrated by his own slides. 8 p.m.

*City of London College Science Society.*—Visit to the Colonial Consignment and Distributing Company's cold stores, Nelson Wharf, Commercial, Lambeth, S.E. 2.45 p.m.

WEDNESDAY, FEBRUARY 6.

*Royal Archæological Institute of Great Britain and Ireland.*—Professor T. McKenny Hughes, M.A., F.R.S., on "The Natural Forms Which Have Suggested Some of the Commonest Implements of Stone, Bone, and Wood." 2. Dr. S. Russell Forbes on "Recent Excavations in the Forum at Rome." 4 p.m.

*Society of Arts.*—Mr. Joseph Pennell on "Some Experiences of Motor Bicycles." 8 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Dr. E. J. Steegmann on "The Atmosphere: Pressure and Composition. Air: Combustion and Respiration." 8 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary meeting of the members. 8 p.m.

*Northern Architectural Association.*—Mr. R. A. Wood on "Luxfer Prisms and Prismatic Lighting: Theory and Application." 7.30 p.m.

THURSDAY, FEBRUARY 7.

*Royal Academy.*—Professor Aitchison, R.A., on "St. Peter's." IV. 4 p.m.

*Civil and Mechanical Engineers' Society.*—Mr. M. Mawson on "The Staines Reservoir Works." 8 p.m.

FRIDAY, FEBRUARY 8.

*Architectural Association.*—Mr. D. T. Fyfe on "Cretan Architecture." 7.30 p.m.

*Royal Institution.*—Professor G. H. Bryan on "History and Progress of Aerial Locomotion." 9 p.m.

*The Institution of Junior Engineers (Westminster Palace Hotel).*—Mr. Louis F. Awde on "Electric Power Supply in the Metropolis." 8 p.m.

*Institution of Mechanical Engineers.*—Adjourned discussion on the following paper:—"Power-gas and Large Gas-engines for Central Stations," by Mr. Herbert A. Humphrey. 8 p.m.

*Glasgow Architectural Craftsmen's Society.*—"Wall Coverings." Mr. C. Sinclair on "Limes," Mr. R. W. Horn on "Cements," and Mr. J. Arthur on "Patent Plasters." 8 p.m.

*Sanitary Institute (Lectures for Sanitary Officers).*—Mr. W. Marriott on "Meteorology." 8 p.m.

*Architectural Association of Ireland (Technical Demonstrations).*—Mr. J. F. Keatinge on Painting, Varnish, Wall-papers, &c. (42, Grafton-street, Dublin) 4.30 p.m.

SATURDAY, FEBRUARY 9.

*Builders' Foremen's Association.*—Annual Dinner, King's Hall, Holborn Restaurant.

*Dundee Institute of Architecture.*—Mr. J. D. Mills on "Warwick and Staffordshire Architecture." 7 p.m.

*Edinburgh Architectural Association.*—Visit to Royal High School, Canongate Parish Church, and Old Tolbooth.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

January 18.—By A. J. SHEFFIELD.

| | |
|---|---|
| Poplar.—223, East India Dock-rd., f., r. 80*l.* | £1,300 |
| 29 to 35 (odd), Findhorn-st., u.t. 74½ yrs., g.r. 15*l.* | 950 |
| 9 and 11, Willis-st., u.t. 44½ yrs., g.r. 6*l.* | 290 |
| Commercial-road East.—Nos. 243, 245, 247, 261, and 367, u.t. 13½ and 33¾ yrs., g.r. 220*l.*, r. 384*l.* 15s. | 380 |
| 14A, 14, 16, 18, and 20, Philpot-st., u.t. 11½ yrs., g.r. 130*l.* | £410 |
| Woodford.—Albert-rd., Albert Cottage, f. | 175 |

January 21.—By THOMAS WOODS.

| | |
|---|---|
| Watford, Herts.—Weymouth-st. Cornwall Villa, f. r. 35*l.* | 620 |
| Hounslow, Middlesex.—St. Stephen's-rd., a plot of building land, f. | 160 |

January 22.—By DEBENHAM, TEWSON & CO.

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|---|---|
| City of London.—St. Paul's Churchyard, f.g.r. 220*l.*, reversion in 38½ yrs. | 10,200 |

By DAVID BURNETT & CO.

| | |
|---|---|
| Islington.—184, Upper-st. beneficial lease for 16½ yrs., r. 60*l.*, with goodwill, &c. | 200 |
| Peckham.—60, Copleston-rd., u.t. 78 yrs., g.r. 6*l.* 10s., e.r. 35*l.* | 295 |

By C. W. DAVIES & SON.

| | |
|---|---|
| Clerkenwell.—35, Lloyd's-row, u.t. 29¾ yrs., g.r. 12*l.* 10s., e.r. 50*l.* | 230 |
| City-rd.—5, Alfred-st., u.t. 25¾ yrs., g.r. 4*l.* 4s., r. 40*l.* | 310 |
| Stamford Hill.—6, 57, and 59, Paignton-rd., u.t. 69 yrs., g.r. 15*l.* 10s. | 660 |
| Brixton.—85, Barnwell-rd., u.t. 73 yrs., g.r. 6*l.* | 300 |

By HAMPTON & SONS.

| | |
|---|---|
| Mayfair.—Grafton-st., &c., Berkeley Mansion, Corporation lease, u.t. 96¼ yrs., g.r. to Christmas, 1905, 1,430*l.*, and thenceforward 1,500*l.*, e.r. 6,500*l.* | 26,000 |

January 23.—By FURBER, PRICE, & FURBER.

| | |
|---|---|
| Kennington.—51, 53, 55, and 59, Carroun-rd., u.t. 20½ yrs., g.r. 9*l.*, r. 127*l.* | 830 |
| Camberwell.—175, Coldharbour-lane, u.t. 41 yrs., g.r. 5*l.*, r. 40*l.* | 325 |
| Bloomsbury.—1, Hunter-st., u.t. 26 yrs., g.r. 34*l.*, r. 80*l.* | 230 |
| Beckenham.—1 & 2, Surrey-villas, with stable in rear, f. | 485 |

By RUSHWORTH & STEVENS.

| | |
|---|---|
| Regent's Park.—20, Albert-st., u.t. 40 yrs., g.r. 5*l.* 10s. | 725 |
| Wandsworth.—15 and 16, Louvaine-rd., u.t. 61 yrs., g.r. 16*l.*, r. 72*l.* | 710 |

January 24.—By W. ASHMOLE.

| | |
|---|---|
| Ilford, Essex.—The Horns-rd., a freehold cottage | 180 |
| Birkbeck-rd., four freehold cottages | 340 |
| Leytonstone.—2, Oak-cottages, f. | 180 |

By C. C. & T. MOORE.

| | |
|---|---|
| Bethnal Green.—42, 44, and 46, Viaduct-st., u.t. 16½ yrs., g.r. 6*l.*, r. 69*l.* | 275 |
| Mile End.—41, 43, and 45, Cleveland-st., area 2,900 ft., f. | 950 |
| Old Ford.—36 and 38, Hewlett-rd., f. | 830 |
| 119 and 133, Roman-rd., f., r. 76*l.* | 1,260 |
| Poplar.—2, 31, and 32, Buxton-ter., u.t. 78 yrs., g.r. 15*l.* | 645 |

By STIMSON & SONS.

| | |
|---|---|
| Penge.—33 to 43 (odd), Croydon-rd., u.t. 62 yrs., g.r. 42*l.*, r. 253*l.* | 2,000 |
| Beckenham.—41, Clock House-rd., u.t. 88½ yrs., g.r. 7*l.*, r. 32*l.* | 305 |
| Walthamstow.—92, 94, and 96, High-st., u.t. 42 yrs., g.r. 14*l.*, r. 108*l.* | 1,200 |
| Old Kent-rd.—72, Mina-rd., u.t. 20½ yrs., g.r. 3*l.* 10s. | 185 |
| 64, Trafalgar-rd., u.t. 31½ yrs., g.r. 5*l.*, r. 36*l.* | 355 |
| Camberwell.—23, 25, and 27, Acorn-st., f. | 480 |
| Peckham.—Denman-rd., a plot of building land with buildings thereon, f. | 860 |
| 1 to 7, Nungate Cottages, f. | 1,100 |

By J. & R. A. WILSON.

| | |
|---|---|
| Brompton.—1, Ovington Mews, u.t. 64 yrs., g.r, 1*l.*, r. 55*l.* | 410 |

By NEWBON, EDWARDS, & SHEPHARD.

| | |
|---|---|
| Barnsbury.—Copenhagen-st., f.g.r. 8*l.*, reversion in 2 yrs. | 650 |
| 75 and 77, Barnsbury-rd., f., e.r. 100*l.* | 1,050 |
| 67, Barnsbury-rd., f., r. 40*l.*; also f.g.r. 16*l.* 5s., reversion in 2 yrs. | 1,500 |
| Barnsbury-rd., f.g.r. 75*l.* 12s., reversion in 2 yrs. | 5,545 |
| Barnsbury-rd., f.g.r. 25*l.* 4s., reversion in ¾ yr. | 1,565 |
| Barnsbury-rd., &c., f.g.r. 15*l.* 4s., reversion in 1 yr. | 1,830 |
| Islington.—184, 185 and 186, Upper-st., c., r. 170*l.* | 3,300 |
| Somers Town.—102 to 112 (even), Aldenham-st.; 29 to 54, Little Clarendon-st.; and 34 and 35, Johnson-st., f., e.r. 1,150*l.* | 10,250 |
| Stoke Newington.—19, Newington Green, f., r. 45*l.* | 850 |
| Gray's Inn-rd.—12, Swinton-st., f., r. 46*l.* | 885 |

*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

## PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| Hard Stocks | 1 | 16 | 0 | per 1,000 | alongside, | in river. |
| Rough Stocks and Grizzles | 1 | 12 | 0 | ,, | ,, | ,, |
| Smooth Bright Facing Stocks | 2 | 18 | 0 | ,, | ,, | ,, |
| Shippers | 2 | 8 | 0 | ,, | ,, | ,, |
| Flettons | 1 | 9 | 0 | ,, | at railway dep't. | |
| Red Wire Cuts | 1 | 15 | 6 | ,, | ,, | ,, |
| Best Fareham Red | 3 | 11 | 6 | ,, | ,, | ,, |
| Best Red pressed Ruabon Facing. | 5 | 5 | 0 | ,, | ,, | ,, |
| Best Blue Pressed Staffordshire | 4 | 7 | 0 | ,, | ,, | ,, |
| Do., Bullnose | 4 | 12 | 0 | ,, | ,, | ,, |
| Best Stourbridge Fire Bricks | 4 | 4 | 6 | ,, | ,, | ,, |

GLAZED BRICKS.

| | | | | | | |
|---|---|---|---|---|---|---|
| Best White and Ivory Glazed Stretchers | 13 | 0 | 0 | ,, | ,, | ,, |

[See also next page.

# CONTRACTS AND PUBLIC APPOINTMENTS.

*(For some Contracts, &c., still open, but not included in this List, see previous issues.)*

## CONTRACTS.

| Nature of Work or Materials. | By whom Required. | Forms of Tender, &c., Supplied by | Tenders to be delivered |
|---|---|---|---|
| Two Boilers, &c. | Great Yarmouth Corporation | J. W. Cockrill, Civil Engineer, Town Hall, Great Yarmouth | Feb. 5 |
| Warehouse, Dundalk | Great Northern Rly. Co. (Ireland) | T. Morrison, Amiens-street Terminus, Dublin | do. |
| Several Cottages, Sutton, Ireland | do. | do. | do. |
| Mason's Work, Akroyd Park | Halifax Corporation | J. Lord, Civil Engineer, Town Hall, Halifax | do. |
| Schools, Britannia-road, Banbury | ..... | Rev. J. E. Pater, The Green, Banbury | Feb. 6 |
| Alterations to Manor House, Barnsley | ..... | J. H. Taylor, Civil Engineer, Barnsley | do. |
| Steel Tramway Rails | Great Yarmouth Corporation | J. W. Cockrill, Civil Engineer, Town Hall, Great Yarmouth | do. |
| Villa, Grattan-place, Fraserburgh, N.B. | Mr. A. Gordon | W. Reid, Civil Engineer, Saltoun-square, Fraserburgh | do. |
| Steading, Kinghorn, N.B. | ..... | W. Stewart, Inverurie | do. |
| Additions to School, Knowl Bank | Golcar (Yorks) School Board | J. Berry, Architect, 9, Queen-street, Huddersfield | do. |
| *Fire Station, &c. | Coventry Corporation | City Engineer, St. Mary's Hall, Coventry | Feb. 7 |
| Four Houses, &c., Park-avenue, Barnsley | ..... | Senior & Clegg, Architects, Regent-street, Barnsley | do. |
| Hospital, Fulwood, near Preston | ..... | J. A. Seward, Architect, 119A, Fishergate, Preston | do. |
| Farm Buildings, Thistley Hill, near Udny, N.B. | ..... | Wilsone & Duffus, Aberdeen | do. |
| Schools | Fernhurst (Sussex) School Board | J. Hill, School Board Offices, Fernhurst | Feb. 8 |
| Pipe Sewers (3¼ miles), Blantyre | Lanark County Council | W. L. Douglass, Civil Engineer, 3, Clydesdale-street, Hamilton | do. |
| Church, near Rawtenstall, Lancs | ..... | Austin & Paley, Architects, Lancaster | do. |
| Waterworks | Chesham (Bucks) U.D.C. | Taylor & Co., Civil Engineers, 27, Great George-street, S.W. | do. |
| Masonry Work, St. Thomas' Church, Newport, I. of W. | ..... | J. B. Colson, Architect, 45, Jewry-street, Winchester | Feb. 9 |
| Building Work, Congregational Church, Carlisle | ..... | Johnstone Bros., Architects, 39, Lowther-street, Carlisle | do. |
| Additions to 9, Gordon-rd., Southtown, Gt. Yarmouth | ..... | C. G. Baker, Architect, Great Yarmouth | do. |
| Six Houses, Hampden-street, Newtown, Wrexham | ..... | W. H. Bosker, Ruabon-road, Wrexham | do. |
| Additions to Nazareth House, Londonderry | ..... | E. J. Toye, Architect, Strand, Londonderry | do. |
| School, &c. | Llanelly School Board | J. B. Morgan, Architect, School Board Offices, Llanelly | Feb. 11 |
| Waterworks | Campbeltown (N.B.) Corporation | J. Fularton, Campbeltown | do. |
| School, Aberbeeg, Mon. | Aberystruth School Board | R. L. Roberts, Architect, Victoria Chambers, Abercarn | do. |
| *Pavilion | Ilford U.D.C. | H. Shaw, Surveyor, 7, Cranbrook-road, Ilford | Feb. 12 |
| Additions to Chapel, Tonyrefail, Glam | ..... | C. Morse, High-street, Tonyrefail | do. |
| Additions to Workhouse, &c. | Mount Bellew (Ireland) Guardians | J. Smith, Architect, Ballinasloe | do. |
| *Electric Light Station | Whitby U.D.C. | Clerk, Council Offices, Whitby, Yorks | do. |
| *Supplies, &c. | West Ham Borough Council | See Advertisement | do. |
| *Kerbing and Tarpaving, &c., Wearside-road | Lewisham Borough Council | Surveyor's Department, Town Hall, Catford, S.E. | do. |
| *Kerbing and Tarpaving, &c., Treviso-road | do. | do. | do. |
| *Kerbing and Tarpaving, &c., Kemble-road | do. | do. | do. |
| *Kerbing and Tarpaving, &c., Vestris-road | do. | do. | do. |
| *Works and Materials | Willesden District Council | Engineer, Council Offices, Dyne-road, Kilburn, N.W. | do. |
| *Cleansing and Watering Roads, &c. | Crown Estate Paving Commrs. | Lodge, Park Square West, Regent's Park | Feb. 13 |
| *Fitting up Kitchen Department | Metropolitan Asylums Board | Office, Embankment, E.C. | do. |
| *Foundations | do. | do. | Feb. 14 |
| Shops, &c., near Durham | Annfield Plain Indus. Co-op. Soc. | G. T. Wilson, Architect, 121, Durham-road, Blackhill | Feb. 16 |
| *Infirmary | Kington Union | C. T. Delfosse, Architect, Duke-street, Kington | Feb. 18 |
| *Painting, &c. | Metropolitan Asylums Board | Offices, Embankment, E.C. | do. |
| *Sewering, Draining, &c. | Hendon U.D.C. | Engineer, Public Office, Hendon, N.W. | do. |
| *Materials, &c. | do. | do. | do. |
| *Alterations to Roof, &c. | Shoreditch Borough Council | Borough Engineer, Town Hall, Old-street, E.C. | Feb. 19 |
| *Alterations to Southern Portion of Holton Bridge | Heading R.D.C. | See Advertisement | do. |
| *Iron Staircases | Wadsley Asylum Committee | See Advertisement | Feb. 20 |
| *Car Sheds, Stores, &c. | Wallasey U.D.C. | J. H. Crowther, Engineer, Great Float, near Birkenhead | Feb. 21 |
| *Engine and Pump House | do. | do. | do. |
| *Administrative Block at Workhouse Infirmary | Sheffield Guardians | Union Offices, Westbar, Sheffield | Feb. 28 |
| *Tanks, Filters, &c. | Wanstead U.D.C. | Council Offices, Wanstead, N.E. | do. |
| *School Buildings | Wrexham County Schools | See Advertisement | do. |
| *Shops, &c. | Walthamstow Parochial Charities | W. A. Longmore, Archt., Bridge Chmbrs., Hoe-st., Walthamstow | do. |
| *Hotel at Felixstowe, Suffolk | Hon. Douglas A. Tollemache | See Advertisement | Mar. 4 |
| *Works and Materials | Hornsey U.D.C. | Engineer, Council Offices, Southwood-lane, Highgate, N. | do. |
| *Extension and Completion of Infirmary | Camberwell Guardians | See Advertisement | Mar. 13 |
| Post Office, Castleford | ..... | Garside & Pennington, Architects, Pontefract | No date |
| School Buildings, Dalkeith | ..... | T. Sturrock, Dalkeith | do. |
| Additions to Hotel, Dove Dale, Derbyshire | Messrs. Evershed, Limited | Garlick & Flint, Architects, Buxton | do. |
| Bank Premises, Dunmanway, Ireland | Munster & Leinster Bank | A. Hill, Architect, 22, George's-street, Cork | do. |
| Three Houses and Shop, Featherstone, Yorks | Mr. J. Walker | W. H. Fearnley, Architect, Featherstone | do. |
| Bakery, Warehouse, &c., Caroline-place, Hull | ..... | Freeman & Co., Architects, 11, Carr-lane, Hull | do. |
| Building Work, 47 and 51, Highgate, Kendal | ..... | J. Stalker, Architect, Kendal | do. |
| Excavations for Warehouse, Wellington-street, Leeds | Messrs. Crowe & Co., Limited | Corson & Jones, Architects, 25, Cookridge-street, Leeds | do. |
| Offices and Playground, Moston, Manchester | ..... | S. M. Chadwick, Architect, Chapel Walks, Manchester | do. |
| Iron Staircases at Workhouse, Withington | Chorlton Union Guardians | J. B. Broadbent, Architect, 15, Cooper-street, Manchester | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Application to be in |
|---|---|---|---|
| *Clerk of Works | Manchester School Board | 3*l.* 3s. per week | Feb. 9 |
| *Chief Assistant | Richmond Town Council | 150*l.* per annum | Feb. 14 |
| *Draughtsman | Hackney Borough Council | 2*l.* 2s. per week | Feb. 15 |

*Those marked with an asterisk (*) are advertised in this Number.* *Competitions, p.—.* *Contracts, pp.* iv. vi. viii. x. & xxi. *Public Appointments, pp.* xviii. & xxi

## PRICES CURRENT (*Continued*).

### BRICKS, &c.

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| Headers | 12 | 0 | 0 | per 1,000 | at railway | depôt. |
| Quoins, Bullnose, and Flats | 17 | 0 | 0 | ,, | ,, | ,, |
| Double Stretchers | 19 | 0 | 0 | ,, | ,, | ,, |
| Double Headers | 16 | 0 | 0 | ,, | ,, | ,, |
| One Side and two Ends | 19 | 0 | 0 | ,, | ,, | ,, |
| Two Sides and one End | 20 | 0 | 0 | ,, | ,, | ,, |
| Splays, Chamfered, Squints | 20 | 0 | 0 | ,, | ,, | ,, |
| Best Dipped Salt Glazed Stretchers and Headers | 12 | 0 | 0 | ,, | ,, | ,, |
| Quoins, Bullnose, and Flats | 14 | 0 | 0 | ,, | ,, | ,, |
| Double Stretchers | 15 | 0 | 0 | ,, | ,, | ,, |
| Double Headers | 14 | 0 | 0 | ,, | ,, | ,, |

## PRICES CURRENT (*Continued*).

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| One Side and two Ends | 15 | 0 | 0 | per 1,000 | at railway | depôt. |
| Two Sides and one End | 15 | 0 | 0 | ,, | ,, | ,, |
| Splays, Chamfered, Squints | 14 | 0 | 0 | ,, | ,, | ,, |
| Seconds Quality White and Dipped Salt Glazed | 2 | 0 | 0 | ,, | less than best. | |

| | s. | d. | |
|---|---|---|---|
| Thames and Pit Sand | 8 | 0 | per yard, delivered. |
| Thames Ballast | 6 | 9 | ,, ,, |
| Best Portland Cement | 38 | 0 | per ton ,, |
| Best Ground Blue Lias Lime | 25 | 6 | ,, ,, |

NOTE.—The cement and lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 13s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks, 32s. 6d. per ton at rly. dpt.

## PRICES CURRENT (*Continued*).

### STONE.

| | s. | d. | | | |
|---|---|---|---|---|---|
| Ancaster in blocks | 2 | 0 | per ft. cube, | deld. | rly. depô |
| Bath ,, | 1 | 7 | ,, | | ,, |
| Farleigh Down Bath | 1 | 8 | ,, | | ,, |
| Beer in blocks | 1 | 6½ | ,, | | ,, |
| Grinshill ,, | 1 | 10 | ,, | | ,, |
| Brown Portland in blocks | 2 | 2 | ,, | | ,, |
| Darley Dale in blocks | 2 | 1½ | ,, | | ,, |
| Red Corsehill ,, | 2 | 5 | ,, | | ,, |
| Red Mansfield ,, | 2 | 4½ | ,, | | ,, |
| Hard York in blocks | 2 | 10 | ,, | | ,, |
| Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.) | 2 | 8 | per ft. super. at rly. depôt. | | |
| ,, ,, 6 in. Rubbed Ditto | 3 | 0 | ,, | | ,, |
| ,, ,, 3 in. sawn both sides slabs (random sizes) | 1 | 3 | ,, | | ,, |
| ,, ,, 3 in. self-faced Ditto | 0 | 9½ | ,, | | ,, |

## PRICES CURRENT (*Continued*).

### SLATES.

| in. in. | £ s. d. | |
|---|---|---|
| 20×10 best blue Bangor | 11 5 0 | per 1000 of 1200 at rly. dep. |
| ,, best seconds ,, | 10 15 0 | ,, ,, |
| 16× 8 best ,, | 6 2 6 | ,, ,, |
| 20×10 best blue Portmadoc | 10 18 0 | ,, ,, |
| 16× 8 best blue Portmadoc | 6 0 0 | ,, ,, |
| 20×10 best Eureka unfading green | 11 2 6 | ,, ,, |
| 16× 8 ,, ,, | 6 15 0 | ,, ,, |
| 20×10 Permanent green | 10 0 0 | ,, ,, |
| 16× 8 ,, ,, | 5 12 6 | ,, ,, |

### TILES.

| | s. d. | |
|---|---|---|
| Best plain red roofing tiles | 41 6 | per 1,000 at rly. depôt. |
| Hip and valley tiles | 3 7 | per doz. ,, ,, |
| Best Broseley tiles | 48 6 | per 1,000 ,, ,, |
| Hip and valley tiles | 4 0 | per doz. ,, ,, |
| Best Ruabon Red, brown or brindled Do. (Edwards) | 57 6 | per 1,000 ,, ,, |
| Do. ornamental Do. | 60 0 | ,, ,, ,, |
| Hip tiles | 4 0 | per doz. ,, ,, |
| Valley tiles | 3 9 | ,, ,, ,, |
| Best Red or Mottled Staffordshire Do. (Peakes) | 50 9 | per 1,000 ,, ,, |
| Hip tiles | 4 1 | per doz. ,, ,, |
| Valley tiles | 3 8 | ,, ,, ,, |

### WOOD.

BUILDING WOOD.—YELLOW.

| | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. | 16 10 0 | 18 0 0 |
| Deals: best 3 by 9 | 14 10 0 | 15 10 0 |
| Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in. | 12 10 0 | 13 10 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 10 0 | less than 7 in. and 8 in. |
| Deals: seconds | 1 0 0 | less than best |
| Battens: seconds | 0 10 0 | ,, ,, ,, |

| | At per load of 50 ft. | | |
|---|---|---|---|
| Fir timber: Best middling Danzig or Memel (average specification) | 4 10 0 | 5 0 0 | |
| Seconds | 4 5 0 | 4 10 0 | |
| Small timber (8 in. to 10 in.) | 3 12 6 | 3 15 0 | |
| Swedish balks | 2 15 0 | 3 0 0 | |
| Pitch pine timber (35 ft. average) | 4 0 0 | 4 10 0 | |

JOINERS' WOOD.

| | At per standard. | | |
|---|---|---|---|
| White Sea: First yellow deals, 3 in. by 11 in. | 27 10 0 | 28 10 0 | |
| 3 in. by 9 in. | 24 0 0 | 25 0 0 | |
| Battens, 2½ in. and 3 in. by 7 in. | 20 0 0 | 21 0 0 | |
| Second yellow deals, 3 in. by 11 in. | 22 10 0 | 24 0 0 | |
| ,, ,, 3 in. by 9 in. | 20 0 0 | 21 0 0 | |
| Battens, 2½ in. and 3 in. by 7 in. | 16 10 0 | 18 0 0 | |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 16 10 0 | 18 0 0 | |
| Battens, 2½ in. and 3 in. by 7 in. | 13 10 0 | 14 10 0 | |
| Petersburg: first yellow deals, 3 in. by 11 in. | 25 0 0 | 26 0 0 | |
| Do. 3 in. by 9 in. | 22 0 0 | 23 0 0 | |
| Battens | 16 10 0 | 17 10 0 | |
| Second yellow deals, 3 in. by 11 in. | 18 10 0 | 20 0 0 | |
| Do. 3 in. by 9 in. | 17 0 0 | 18 0 0 | |
| Battens | 14 0 0 | 14 10 0 | |
| Third yellow deals, 3 in. by 11 in. | 15 0 0 | 16 10 0 | |
| Do. 3 in. by 9 in. | 14 0 0 | 14 10 0 | |
| Battens | 12 10 0 | 13 10 0 | |
| White Sea and Petersburg:— | | | |
| First white deals, 3 in. by 11 in. | 15 10 0 | 16 10 0 | |
| ,, ,, 3 in. by 9 in. | 14 0 0 | 15 0 0 | |
| Battens | 12 10 0 | 13 10 0 | |
| Second white deals 3 in. by 11 in. | 14 0 0 | 15 0 0 | |
| ,, ,, ,, 3 in. by 9 in. | 13 0 0 | 14 0 0 | |
| ,, ,, battens | 11 0 0 | 12 0 0 | |
| Pitch pine: deals | 16 0 0 | 18 0 0 | |
| Under 2 in. thick extra | 0 10 0 | 1 0 0 | |
| Yellow Pine— | | | |
| First, regular sizes | 30 0 0 | 33 0 0 | |
| Broads (12 in. and up) | 2 0 0 | more. | |
| Oddments | 22 0 0 | 24 0 0 | |
| Seconds, regular sizes | 24 10 0 | 26 10 0 | |
| Yellow Pine Oddments | 20 0 0 | 22 0 0 | |
| Kauri Pine— | | | |
| Planks, per ft. cube | 9 3 6 | 0 4 6 | |
| Danzig and Stettin Oak Logs— | | | |
| Large, per ft. cube | 0 2 6 | 0 2 8 | |
| Small ,, ,, | 0 2 4 | 0 2 7 | |
| Wainscot Oak Logs, per ft. cube | 0 5 0 | 0 5 6 | |
| Dry Wainscot Oak, per ft. sup. as inch | 0 0 8 | 0 0 9 | |
| ¾ in. do. do. | 0 0 7 | . . . | |
| Dry Mahogany— | | | |
| Honduras, Tabasco, per ft. sup. as inch | 0 0 9 | 0 0 11 | |
| Selected, Figury, per ft. sup. as inch | 0 1 6 | 0 2 0 | |
| Dry Walnut, American, per ft. sup. as inch | 0 0 10 | 0 1 0 | |
| Teak, per load | 16 0 0 | 20 0 0 | |
| American Whitewood Planks— | | | |
| Per ft. cube | 0 2 3 | 0 3 0 | |

### JOISTS, GIRDERS, &c.

| | In London, £ s. d. | or delivered to Railway Vans, per ton. £ s. d. |
|---|---|---|
| Rolled Steel Joists, ordinary sections | 8 0 0 | 9 0 0 |
| Compound Girders ,, | 9 10 0 | 10 15 0 |
| Angles, Tees and Channels, ,, ordinary sections | 9 12 6 | 11 12 6 |
| Flitch Plates | 10 0 0 | 10 15 0 |
| Cast Iron Columns and Stanchions, including ordinary patterns | 8 5 0 | 10 0 0 |

## PRICES CURRENT (*Continued*).

### METALS.

| | Per ton, in London. £ s. d. | £ s. d. |
|---|---|---|
| IRON.— | | |
| Common Bars | 9 10 0 | . . . |
| Staffordshire Crown Bars, good merchant quality | 9 15 0 | 10 0 0 |
| Staffordshire "Marked Bars" | 11 10 0 | . . . |
| Mild Steel Bars | 9 10 0 | 10 10 0 |
| Hoop Iron, basis price | 10 5 0 | 10 15 0 |
| ,, ,, galvanised | 16 0 0 | . . . |
| (* And upwards, according to size and gauge.) | | |
| Sheet Iron, Black.— | | |
| Ordinary sizes to 20 g. | 10 15 0 | . . . |
| ,, ,, to 24 g. | 11 15 0 | . . . |
| ,, ,, to 26 g. | 13 5 0 | . . . |
| Sheet Iron, Galvanised, flat, ordinary quality.— | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 13 0 0 | . . . |
| ,, ,, 22 g. and 24 g. | 13 15 0 | . . . |
| ,, ,, 26 g. | 15 10 0 | . . . |
| Sheet Iron, galvanised, flat, best quality.— | | |
| Ordinary sizes to 20 g. | 17 0 0 | . . . |
| ,, ,, 22 g. and 24 g. | 17 10 0 | . . . |
| ,, ,, 26 g. | 19 0 0 | . . . |
| Galvanised Corrugated Sheets.— | | |
| Ordinary sizes, 6 ft. to 8 ft. 20 g. | 13 0 0 | . . . |
| ,, ,, 22 g. and 24 g. | 13 10 0 | . . . |
| ,, ,, 26 g. | 14 0 0 | 1 10 0 |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 13 0 0 | . . . |
| ,, ,, 22 g. and 24 g. | 14 0 0 | . . . |
| ,, ,, 26 g. | 15 0 0 | . . . |
| Cut nails, 3 in. to 6 in. | 11 10 0 | . . . |
| (Under 3 in. usual trade extras.) | | |
| LEAD—Sheet, English, 3 lbs. & up. | 19 5 0 | . . . |
| Pipe in coils | 19 15 0 | . . . |
| Soil Pipe | 22 15 0 | . . . |
| ZINC—Sheet— | | |
| Vieill6 Montagne ton | 26 0 0 | . . . |
| Silesian | 25 10 0 | . . . |
| COPPER— | | |
| Strong Sheet per lb. | 0 1 1 | . . . |
| Thin ,, | 0 1 3 | . . . |
| Copper nails ,, | 0 1 3 | . . . |
| BRASS— | | |
| Strong Sheet ,, | 0 0 11 | . . . |
| Thin ,, ,, | 0 1 1 | . . . |
| TIN—English Ingots ,, | 0 1 4½ | . . . |
| SOLDER—Plumbers' ,, | 0 0 9 | . . . |
| Tinmen's ,, | 0 0 9½ | . . . |
| Blowpipe ,, | 0 0 10½ | . . . |

### ENGLISH SHEET GLASS IN CRATES.

| | |
|---|---|
| 15 oz. thirds | 2½d. per ft. delivered. |
| ,, fourths | 2¾d. ,, ,, |
| 21 oz. thirds | 3½d. ,, ,, |
| ,, ,, fourths | 3d. ,, ,, |
| 26 oz. thirds | 4½d. ,, ,, |
| ,, ,, fourths | 4d. ,, ,, |
| 32 oz. thirds | 5½d. ,, ,, |
| ,, ,, fourths | 5d. ,, ,, |
| Fluted sheet, 15 oz. | 3½d. ,, ,, |
| ,, ,, 21 ,, | 4¼d. ,, ,, |
| ½ Hartley's Rolled Plate | 3d. ,, ,, |
| ⅝ ,, ,, ,, | 3½d. ,, ,, |
| ¼ ,, ,, ,, | 4d. ,, ,, |

### OILS, &c.

| | | £ s. d. |
|---|---|---|
| Raw Linseed Oil in pipes | per gallon | 0 2 10 |
| ,, ,, ,, in barrels | ,, | 0 2 11 |
| ,, ,, ,, in drums | ,, | 0 3 1 |
| Boiled ,, ,, in pipes | ,, | 0 3 1 |
| ,, ,, ,, in barrels | ,, | 0 3 2 |
| ,, ,, ,, in drums | ,, | 0 3 4 |
| Turpentine, in barrels | ,, | 0 2 8 |
| ,, in drums | ,, | 0 2 10 |
| Genuine Ground English White Lead | per ton | 27 0 0 |
| Red Lead, Dry | ,, | 24 10 0 |
| Best Linseed Oil Putty | per cwt. | 0 9 0 |
| Stockholm Tar | per barrel | 1 10 0 |

### VARNISHES, &c.

| | per gallon £ s. d |
|---|---|
| Fine Elastic Copal Varnish for outside work | 0 16 6 |
| Best Elastic Copal Varnish for outside work | 1 0 0 |
| Best Elastic Carriage Varnish for outside work | 0 16 6 |
| Best Hard Oak Varnish for inside work | 0 10 6 |
| Best Extra Hard Church Oak Varnish for inside work | 0 10 6 |
| Fine Hard Copal Varnish for inside work | 0 16 0 |
| Best Hard Copal Varnish for inside work | 1 0 0 |
| Best Hard Carriage Varnish for inside work | 0 16 0 |
| Extra Pale Paper Varnish | 0 12 0 |
| Best Japan Gold Size | 0 10 0 |
| Best Black Japan | 0 16 0 |
| Oak and Mahogany Stain | 0 9 0 |
| Brunswick Black | 0 9 0 |
| Berlin Black | 0 15 0 |
| Knotting | 0 10 0 |
| Best French and Brush Polish | 0 10 0 |

## TO CORRESPONDENTS.

M. & F. (Amounts should have been stated.)

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

*We cannot undertake to return rejected communications.*

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

## TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ARBROATH.—For the erection of a hospital for the Burgh of Arbroath and the Arbroath district of the county of Forfar. Mr. Hugh Gavin, architect, Arbroath:—

| | |
|---|---|
| *Masonry.*—Christie & Anderson, Arbroath | £4,263 7 6 |
| *Joinery.*—A. Scott, Arbroath | 2,640 0 0 |
| *Plumbing.*—D. M'Kay, Carnoustie | 1,385 0 0 |
| *Plastering.*—Middleton & Donald, Arbroath | 389 0 0 |
| *Slating.*—Mitchell & Son, Arbroath | 382 19 0 |

BELVEDERE (Kent).—For proposed Board offices, &c., and cookery centre at Picardy Schools, Belvedere, Kent, for the Erith School Board. Messrs. Ford, Son, & Burrows, architects, 21, Aldermanbury, E.C.:—

| | Board offices, pupil teachers', attendants', and waiting rooms, &c. | Cookery centre, &c. | Alterations and additions to drains and to caretaker's house, infants', boys', and girls' schools, by Jennings. |
|---|---|---|---|
| Woodward & Co. | £4,298 | £2,301 | £625 |
| Patman & Fotheringham | 3,953 | 2,181 | 574 |
| Martin, Wells, & Co. | 3,951 | 2,179 | 601 |
| Tonge | 3,916 | 2,088 | 558 |
| Jerrard & Sons | 3,874 | 2,198 | 603 |
| Miles | 3,860 | 2,142 | 547 |
| Foster Bros. | 3,504 | 2,013 | 540 |
| Proctor | 3,493 | 2,295 | 547 |
| Thomas & Edge | 3,464 | 2,069 | 565 |
| Enness Bros. | 3,363* | 1,997* | 547* |

FALMOUTH.—For the erection of police station, &c., for the Standing Joint Committee. Mr. Oliver Caldwell, architect, Victoria-square, Penzance:—

| | | | |
|---|---|---|---|
| Rickard | £4,564 | George Miners, Marazion* | £3,797 |
| Buscombe & Sons | 4,400 | | |
| C. & J. Harris | 4,035 | | |

HEAMOOR (Cornwall).—For the erection of school buildings for the Madron School Board. Mr. Oliver Caldwell, architect, Penzance:—

| | | | |
|---|---|---|---|
| Burnett & James | £1,432 9 8 | Burnett & Berryman, Penzance* | £1,426 10 |
| | | E. Pedwell | 1,425 0 |

KILLARNEY (Ireland).—For the erection of lodging houses (exclusive of making roads, footpaths, main drainage, and main water pipes) for the Urban District Council. Mr. Duncan Scott, C.E.:—

| | |
|---|---|
| P. Murphy, 14 one story and 9 two story | £3,551 |
| Timothy Gallivan, 14 one story and 9 two story | 3,337 |
| J. B. Healy, Tralee, 14 one story and 9 two story | 3,290 |
| F. Nunan, 9 two story only | 2,200 |
| P. Murphy, 14 two story only | 1,745 |

KINGSTON-ON-THAMES.—For the erection of additions to laundry and coal stores at the Kingston Workhouse. Mr. W. H. Hyde, architect, 87, Brayards-road, Peckham, S.E. Quantities supplied:—

| | |
|---|---|
| J. W. Brooking | £3,000 0 0 |
| Goddard & Sons | 2,883 0 0 |
| E. F. McCarthy | 2,766 13 3 |
| Windsor & Co. | 2,711 8 0 |
| Foster Bros. | 2,677 0 0 |
| E. Chamberlain | 2,608 5 9 |
| W. J. Renshaw | 2,497 0 0 |
| Veale & Carter | 2,393 0 0 |
| W. J. Bowden | 2,122 10 0 |

LEICESTER.—For the erection of offices, &c., St. James's and Earl-streets, for the National Union of Boot and Shoe Operatives (Leicester No. 1 Branch). Messrs. Harrison & Hattrell, architects, 34, Friar-lane, Leicester:—

| | | | |
|---|---|---|---|
| Tyers & Yates | £4,750 | Leicester Builders, Ltd., Leicester* | £4,680 |
| W. G. Brown | 4,685 | | |

LEIGH-ON-SEA.—For making-up, kerbing, channelling, and paving roads at Leigh-on-Sea. Messrs. Smee, Mence, & Houchin, architects and surveyors, 12, West Smithfield, E.C.:—

*Lowest Tenders.*

| | | | |
|---|---|---|---|
| Leighville-grove | Harris & Rowe | .. | £813 7 4 |
| Southsea-avenue | ,, | .. | 752 0 1 |
| Lymington-avenue | ,, | .. | 749 13 2 |
| Cranleigh Drive | ,, | .. | 983 1 11 |
| Marine Parade | ,, | .. | 1,049 11 3 |
| Cliff-road | Wm. Iles | .. | 1,205 0 0 |
| North-street | ,, | .. | 210 0 0 |
| West-street | ,, | .. | 256 0 0 |
| East-street | ,, | .. | 282 0 0 |
| Alexandra-street | ,, | .. | 282 0 0 |
| Ashleigh Drive | ,, | .. | 341 0 0 |
| Redcliff Drive | ,, | .. | 449 0 0 |

LONDON.—For the erection of new branch library at Highgate, for the Hornsey Urban District Council. Mr. W. H. Hyde, architect, 87, Brayards-road, Peckham, S.E. Quantities supplied:—

| | | | |
|---|---|---|---|
| Leslie & Co. | £5,258 | Wilson Bros. & Lamplough | £4,516 |
| Thompson & Beveridge | 4,912 | W. T. Batchelor | 4,360 |
| Kerry & Sons | 4,800 | Willmott & Sons | 4,286 |
| General Builders' Co. | 4,797 | Foster Bros. | 4,174 |
| H. L. Holloway | 4,781 | Lawrence & Sons | 4,169 |
| Spiers & Sons | 4,676 | Webking & Co. | 4,162 |
| Chessum & Sons | 4,613 | W. Wade | 3,998 |
| J. Appleby | 4,600 | | |

[*See also next page.*

PEMBERTON (Lancs.). — For building generating station and tall chimney, for Pemberton Urban District Council :—

| | | | |
|---|---|---|---|
| Wm. France | £4,390 0 0 | T. & H. Houghton, Warrington-rd., New-town Pemberton* | £3,694 0 0 |
| Johnson & Son | 4,325 0 0 | | |
| A. Bywater | 4,288 0 0 | | |
| W. Winnard | 4,286 0 0 | | |
| David A. Ablett | 3,914 0 0 | | |
| Alex. Wigan | 3,870 0 0 | Wilson & Co. | 3,585 0 0 |

PEMBERTON (Lancs.).—For paving and kerbing Harriet-place, Ormskirk-road, for the Urban District Council :—

| | Paving Per sq. yard. | Kerbing. Per lin. yard. |
|---|---|---|
| | d. | d. |
| Robert Bradley | 7½ | 7½ |
| John T. Peet | 7 | 4 |
| Thomas Nixon | 6 | 3 |
| Joshua Bradley | 4¾ | 3 |
| James Bratherton, Newtown, Pemberton* | 4½ | 3½ |

ROCHFORD (Essex). — For erecting an isolation hospital, Sutton Ford Bridge, for the Rochford District Council. Messrs. C. & W. H. Pertwee, architects, Chelmsford :—

| | | | |
|---|---|---|---|
| Foster Bros. | £5,169 | Davis & Leaney | £4,028 |
| Gibb & Co. | 4,800 | Hammond & Son | 3,989 |
| Smith & Son | 4,669 | Dupont & Co. | 3,987 |
| A. W. Robins | 4,598 | T. H. Coleman | 3,945 |
| Silas Parmenter | 4,500 | F. & E. Davey | 3,897 |
| Enness Bros. | 4,498 | Coulson & Lofts | 3,888 |
| Snewin Bros. | 4,464 | W. E. Davey | 3,820 |
| West Bros. | 4,430 | S. Norden, Rochford, Essex* | 3,810 |
| E. West | 4,242 | Harris & Rowe | 3,724 |
| Jno. Rayner | 4,078 | | |

SALTASH (Cornwall).—For repairing roads, boundary walls, &c., on the Port View Estate, for the trustees. Mr. Edgar M. Leest, surveyor, Devonport and Saltash :—

| | | | |
|---|---|---|---|
| W. Blake | £857 0 0 | Taylor & Mutton | £375 15 0 |
| J. Coles | 528 2 5 | W. C. Shaddock, Plymouth† | £337 2 8 |
| W. H. Rothery | 415 0 0 | | |

STOKE-UPON-TRENT. — For the erection of a laundry and boiler-house at workhouse, for the Guardians. Mr. C. Lynam, architect, Stoke-upon-Trent :—

| | | | |
|---|---|---|---|
| H. P. Embry & Co. | £5,913 | T. Godwin | £5,551 |
| J. Bagnall | 5,845 | T. R. Yoxall, Stoke-on-Trent* | 5,443 |
| Meikeljohn & Son | 5,795 | | |

SURBITON.—For the erection of mortuary, Alpha-road; and (2) road works, Tolworth, &c., Surbiton-hill, for the Urban District Council. Mr. S. Mather, surveyor, Council Offices, Surbiton :—

*Mortuary.*

| | | | |
|---|---|---|---|
| E. Tomkinson | £798 0 0 | W. Hobern | £629 0 0 |
| McDonald Bros. | 733 0 0 | J. Pavey | 598 0 0 |
| Higby & Rabson | 674 12 0 | G. Merredew | 598 0 0 |
| Surveyor's estimate | £617 2 0 | | |

*Making-up Roads.*

| | | | |
|---|---|---|---|
| R. M. Parkinson | £2,598 0 0 | Thos. Adams | £2,057 9 8 |
| Clift Ford | 2,179 0 0 | S. Atkins | 1 841 0 0 |
| Fry Bros. | 2,168 16 8 | J. Nicholas | 1,751 16 0 |
| Free & Sons | 2,088 15 2 | S. Kavanagh, Surbiton* | 1,650 4 9 |
| Surveyor's estimate | £1,699 2 1 | | |

URMSTON (Lancs.).—For the erection of a girder bridge over Ouzel Brook, for the Moss Side Urban District Council. Mr. H. B. Longley, Engineer, Council Offices, Moss Side, Manchester :—

Wootton & Son, Moss Side, Manchester.. £144 14 3

The lowest of five tenders received.

## LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following list of tenders. Mr. T. J. Bailey is the Board's Architect ;—

HIGHWAY GRADED SCHOOL (St. George's-in-the-East).—For sanitary and drainage works :—

| | | | |
|---|---|---|---|
| Munday & Son | £3,428 0 0 | Johnson & Co. Ltd. | £3,046 0 0 |
| Godson & Sons | 3,384 19 0 | Killingback & Co. | 2,942 0 0 |
| Martin, Wells & Co. | 3,053 0 0 | Stevens Bros. | 2,314 15 4 |
| | | Ashby & Horner* | 2,499 0 0 |

GLOBE-TERRACE SCHOOL (Bethnal Green).—For sanitary and drainage works :—

| | |
|---|---|
| Godson & Sons | £3,218 11 2 |
| Martin, Wells, & Co. | 2,937 0 0 |
| Killingback & Co. | 2,928 0 0 |
| Stevens Bros. | 2,775 0 0 |
| Willmott & Sons | 2,694 0 0 |
| Lawrance & Sons | 2,591 0 0 |
| Johnson & Co. | 2,526 0 0 |
| Williams & Son | 2,495 0 0 |
| F. Bull* | 2,352 0 0 |

HEAD OFFICES OF THE BOARD.—Repairs to heating apparatus in Evening Continuation Schools Department :—

| | | | |
|---|---|---|---|
| Brightside Foundry and Engineering Co., Limited | £104 0 | J. & F. May | £76 0 |
| John Esson | 89 10 | A. A. Morris & Co. | 62 10 |
| | | J. Wontner-Smith, Gray & Co.* | 61 10 |


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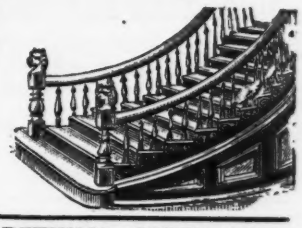

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Provided that the work is satisfactorily done, the appointment will continue for a period of not less than six months.
Applications, which should state age, qualifications, and present occupation, and be accompanied by not more than three testimonials of recent date, must be endorsed "Temporary Draughtsman," and be delivered to Mr. NORMAN SCORGIE, C.E. Borough Engineer and Surveyor, Town Hall, Hackney, N.E. not later than FIVE p.m. on FRIDAY, the 15th FEBRUARY, 1901.
By order,
GEORGE GROCOTT,
Acting Town Clerk.

THE SCHOOL BOARD FOR LONDON require additional MANUAL TRAINING INSTRUCTORS and ASSISTANT INSTRUCTORS in WOODWORK, for the instructions of scholars in the Day Schools of the Board. The scale of salaries is as follows: Instructors, minimum, 100*l.* per annum; annual increase, 5*l.*; maximum, 155*l.* Assistant Instructors, minimum, 80*l.* per annum; annual increase, 5*l.*; maximum, 100*l.*
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A certificate of competency to teach woodwork will also be required (the certificate of the City and Guilds of London Institute, or a certificate in Sloyd will be accepted).
The salary of Instructors and Assistant Instructors is for 37½ hours a week, some of which may be in the evening. Instructors and Assistant Instructors, may be required to teach woodwork for two additional evenings a week, at 4*s.* an evening, of two hours' instruction. No evening work, other than that which may be provided by the Board, is to be undertaken, without the knowledge and consent of the School Management Committee.
Teachers in the service of the Board, will be allowed to commence at their present salary, provided such salary be within the scale for Instructors. The persons appointed will be required, if necessary, to attend classes for further instruction, as directed by the School Management Committee.
Applications must be made on a form, to be obtained at the Offices of the Board, and accompanied by copies of not more than three testimonials, must reach the Clerk of the Board, School Board for London, Victoria Embankment, not later than THURSDAY, 28th FEBRUARY, 1901, marked outside, "M. T. Application. S. M." Persons applying through the post for forms of application, must enclose stamped and addressed envelopes.
Candidates from the country, invited to attend the Committee, will be allowed third-class return railway fare to the London terminus. In the case of candidates selected for appointment, the fare will not be paid until after they shall have commenced work. If a selected candidate should refuse to take up his appointment, no travelling expenses will be allowed.

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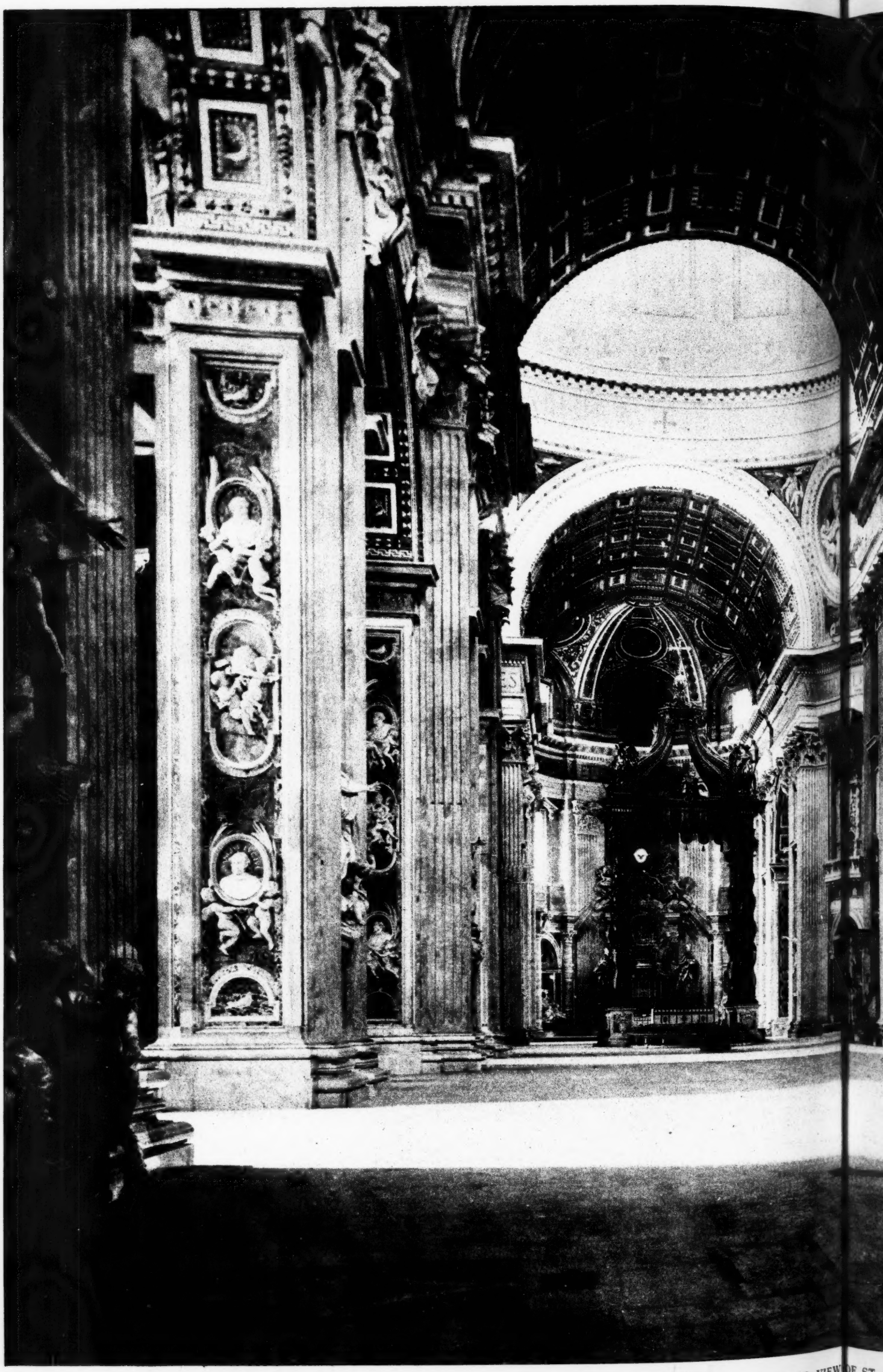
Applications, endorsed "Surveyor's Chief Assistant," in applicant's own handwriting, stating age and previous experience, with copies of not more than three testimonials of recent date, to be sent to the Town Clerk, Town Hall, Richmond, Surrey, not later than THURSDAY, FEBRUARY 14th, 1901.
J. H. BRIERLEY, Assoc. M. Inst. C.E.
Borough Surveyor.
Town Hall,
Richmond, Surrey.
January 29th, 1901.



INTERIOR VIEW [illegible]F ST.

(IN ILLUSTRATION OF PROFESSOR AI[illegible]HISON'S

GENERAL LIBRARY,
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FEB 18 1901

VIEW OF ST. PETER'S.

SOR AITCHISON'S ROYAL ACADEMY LECTURES.)

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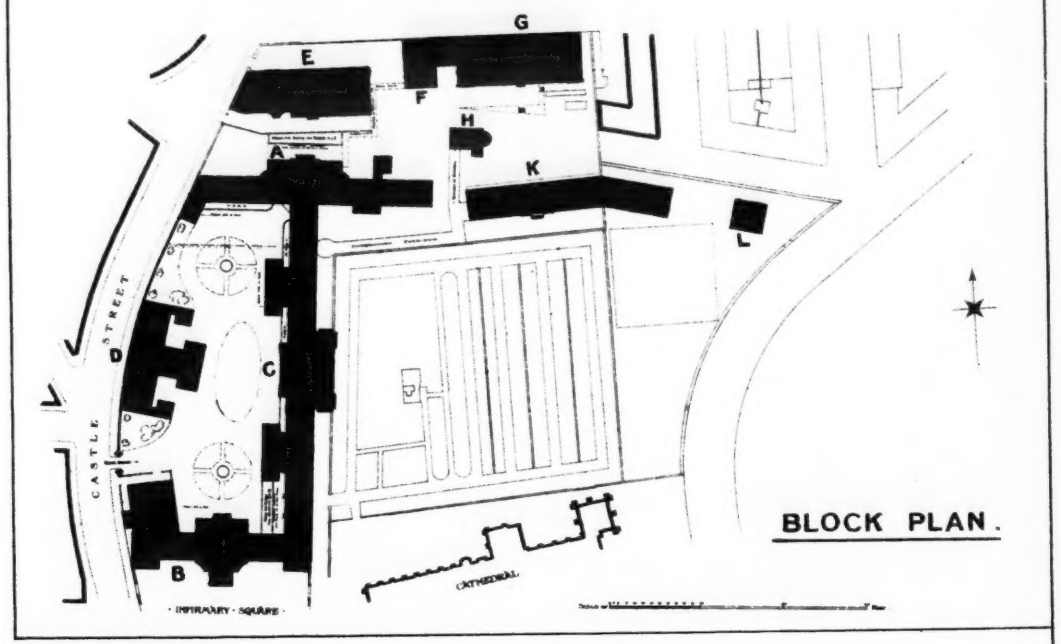
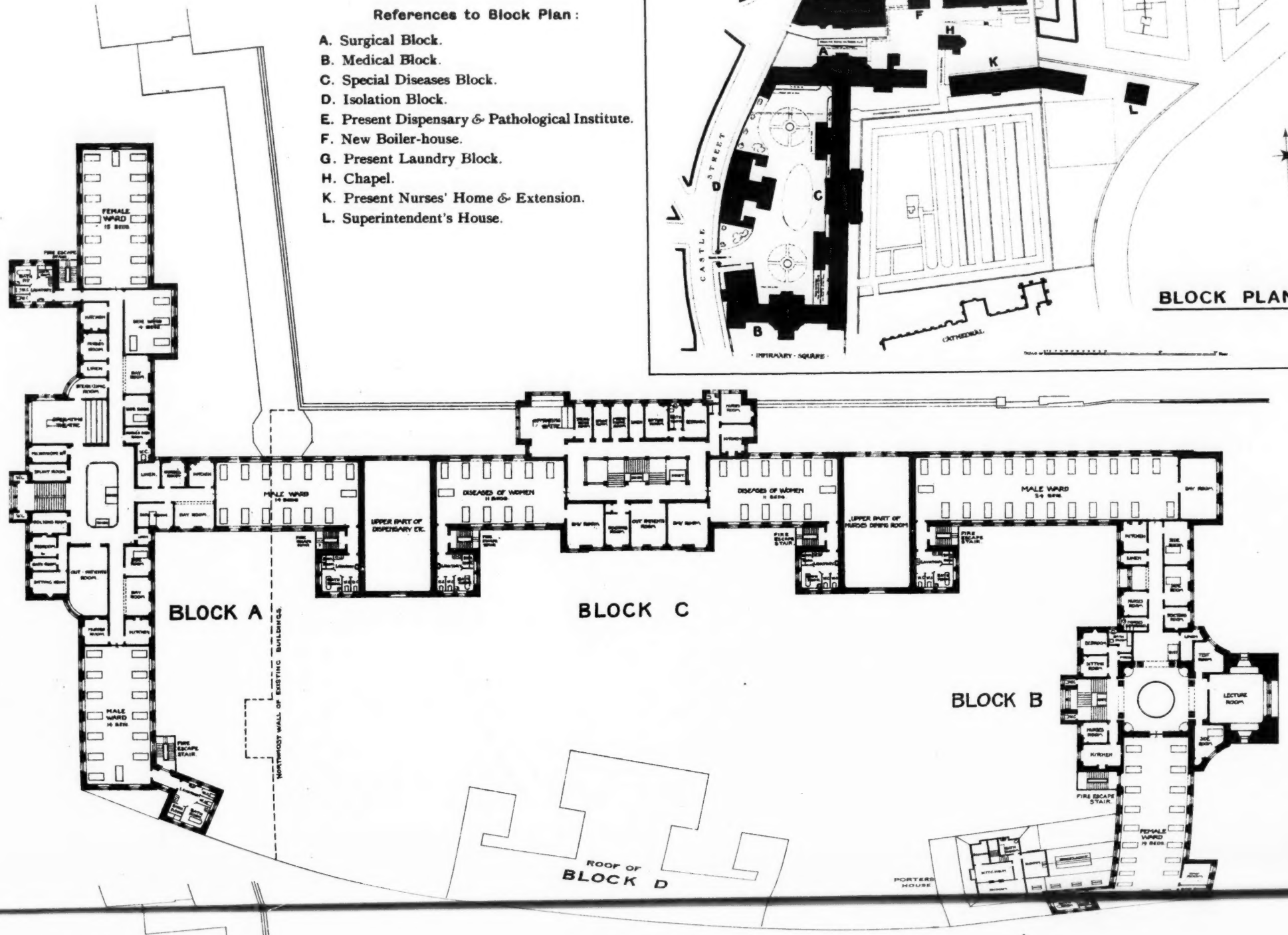
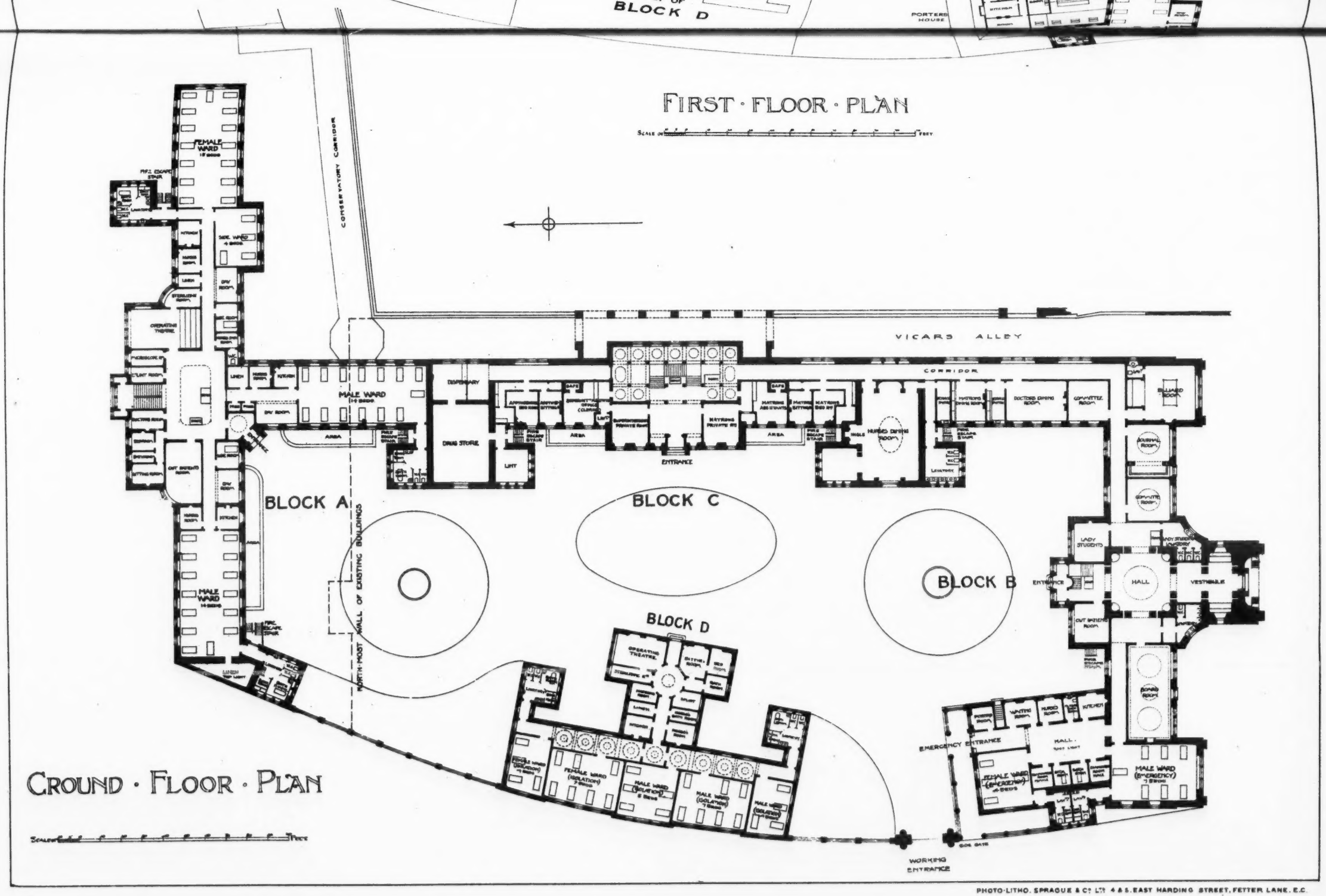
**References to Block Plan:**

A. Surgical Block.
B. Medical Block.
C. Special Diseases Block.
D. Isolation Block.
E. Present Dispensary & Pathological Institute.
F. New Boiler-house.
G. Present Laundry Block.
H. Chapel.
K. Present Nurses' Home & Extension.
L. Superintendent's House.




BLOCK PLAN.



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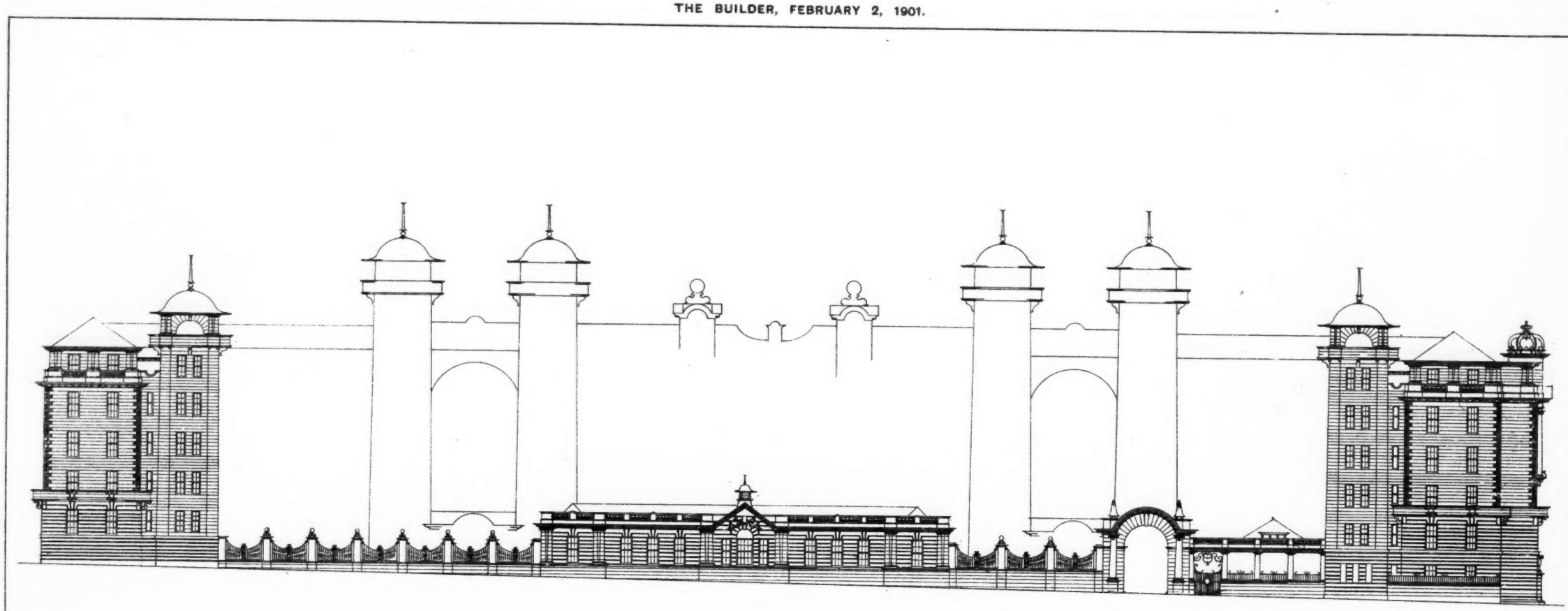
GLASGOW ROYAL INFIRMARY COMPETITION: DESIGN PLACED FIRST BY THE ASSESSOR.—MR. H. E. CLIFFORD, ARCHITECT.



ELEVATION · TO · CASTLE · STREET

SECTIONAL · ELEVATION · TO · VICAR'S · ALLEY

SCALE OF FEET.

SECTIONAL · ELEVATION · TO · QUADRANGLE
FACING · CASTLE · STREET ·

SCALE OF FEET

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GLASGOW ROYAL INFIRMARY COMPETITION: DESIGN PLACED FIRST

PERSPECTIVE VIEW TOWARDS INFIRM

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GN PLACED FIRST BY THE ASSESSOR.—Mr. H. E. Clifford, Architect.

EW TOWARDS INFIRMARY SQUARE.